MAKING SURE OF
Arithmetic

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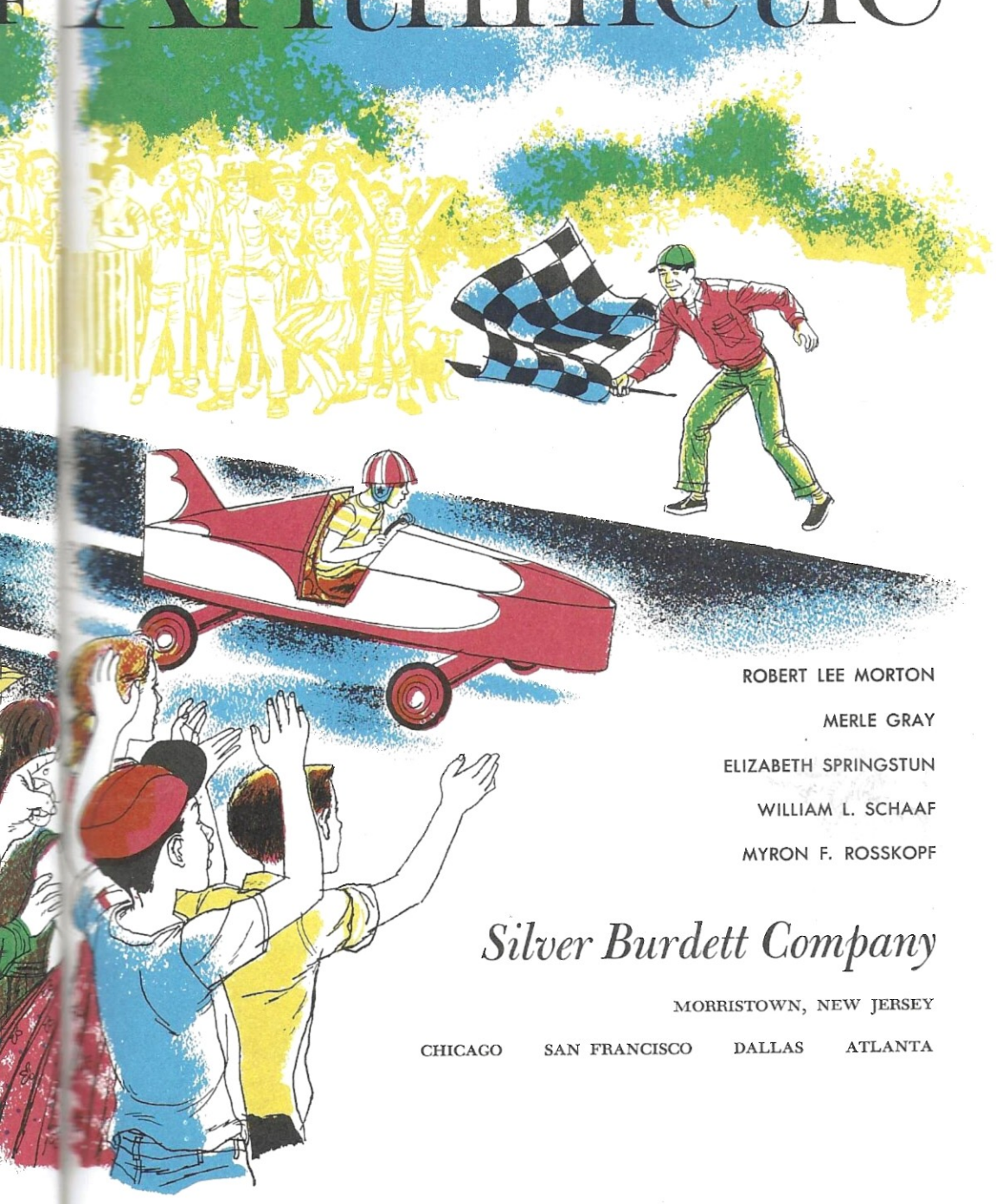

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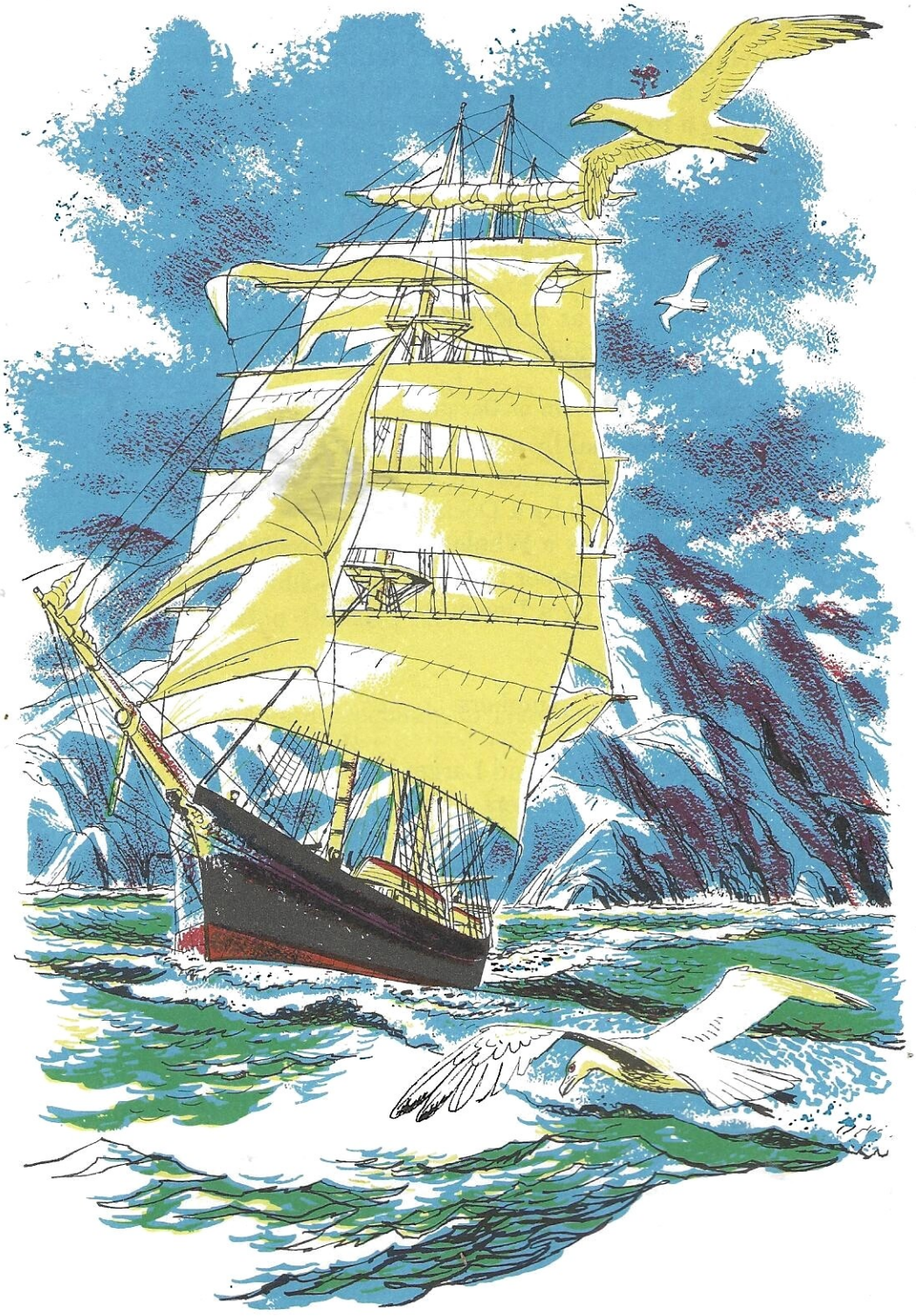
MORRISTOWN, NEW JERSEY

CHICAGO SAN FRANCISCO DALLAS ATLANTA



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1 Making Sure of Whole Numbers

FROM EAST TO WEST

1. After the discovery of gold in California in 1849, many Easterners sailed in clipper ships from Boston, around the tip of South America, to San Francisco. Usually the trip took 100 days. But in 1854, the clipper ship *Flying Cloud* made a record passage of 89 days. How many days less than the usual time was this? About how many months did this trip take?

2. When the Panama Canal was opened in 1914, a steamship could make the trip from Boston to San Francisco in 17 days. How many days more than this was the usual clipper ship passage? How many days more than this was the *Flying Cloud's* record trip?

3. The distance for the *Flying Cloud* around the tip of South America was 13,322 miles. The distance for the steamship by way of the Panama Canal was 5,444 miles. By how many miles did the opening of the Panama Canal shorten the distance by water between Boston and San Francisco?

4. In 1869, the first transcontinental railroad was completed. The normal run between Boston and San Francisco took 8 days. How many hours is this?

5. Between Boston and San Francisco the distance by rail is 3,361 miles, by road 3,102 miles, and by air 2,699 miles. How many miles more is the distance by rail than by air? by road than by air?

6. Today, a flight by airliner between Boston and San Francisco takes about 10 hours. Compare this time with the time by the early transcontinental trains. How many hours less is it?

WHAT DO NUMBERS MEAN?

What does the 7 mean in the **two-place number** 47? What does the 4 mean?

What does the 2 mean in the **three-place number** 286?

The meaning, or value, of a figure depends on its place, or position, in a number. Its position tells us its **place value.**

In the number 200, the two zeros show that there are no ones in ones' place and no tens in tens' place. The zeros "hold" ones' place and tens' place. They also make the 2 mean 2 hundreds. Each of the zeros is a **place-holder.**

We may also think of other figures as place-holders. For example, in the number 25, the 5 is a place-holder. It holds ones' place, and makes the 2 mean 2 tens.

Look at the three numbers at the right.

8,643
27,510
469,278

The first number is a **four-place number.** The 8, the fourth figure from the right, is in thousands' place. It means 8 thousands.

The second number is a **five-place number.** The 2, the fifth figure from the right, is in ten-thousands' place. It means 2 ten-thousands.

The third number is a **six-place number.** The 4, the sixth figure from the right, is in hundred-thousands' place. It means 4 hundred-thousands.

In writing five- and six-place numbers, a comma is used to separate the three figures at the right from the others. A comma is sometimes used in writing four-place numbers also.

1. Tell what the 7 means in each of these numbers.

470 207 1785 27,150 72,962 734,625

2. What places do the zeros hold in the number 5800? in 20,406? in 100,000?

3. In the number 60,740 which figures are place-holders?

The number shown in the chart at the right is a **seven-place number.** The 8, the seventh figure from the right, is in millions' place. It means 8 millions.

The name and meaning of each place in this seven-place number is shown at the right.

This number is read, "eight million, seven hundred twenty-four thousand, six hundred twenty-five."

Beginning at the right, large numbers are divided by commas into groups of three figures each. In a seven-place number, two commas are used to separate the figures, as shown in the number 8,724,625.

4. Tell what the 5 means in each of these numbers.

a. 4,285,697 **b.** 3,548,028 **c.** 9,000,425
d. 752,000 **e.** 163,452 **f.** 5,340,846

5. What do the zeros mean in **c**? in **d**?

6. Which of the six numbers above is the largest?

7. Write a seven-place number that has no ones, no thousands, and no ten-thousands.

8. Count to one million by 100,000's.

9. A million is how much more than 100,000?

READING AND WRITING LARGE NUMBERS

In a recent year, 1,368,515 persons visited Yellowstone National Park. This number is read, "one million, three hundred sixty-eight thousand, five hundred fifteen."

In reading numbers do not use the word *and* to connect parts of a whole number.

Read the following numbers. The four-place numbers may be read in two ways. For example, the number 1959 may be read, "one thousand, nine hundred fifty-nine," or "nineteen hundred fifty-nine."

	a	b	c	d
1.	1946	1776	4850	5400
2.	15,208	17,050	210,625	145,006
3.	1,486,398	4,540,050	3,800,000	5,000,500
4.	6,010,009	8,376,000	2,009,048	9,205,607

Copy the following numbers and place commas where they belong. Read the numbers.

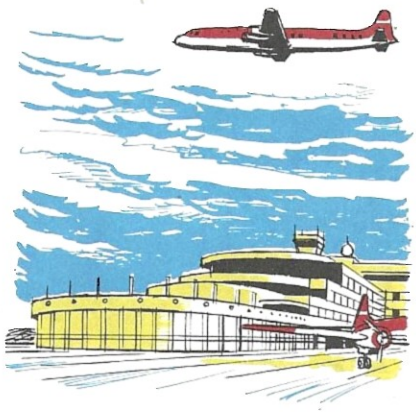
5.	86606	27800	5005	11728
6.	10000	14573	216080	318600
7.	1000000	1250000	3485698	4444444

8. Write these numbers in figures.

- **a.** Seven thousand, four hundred fifty.
- **b.** Two hundred forty thousand.
- **c.** One million, fifty thousand, five hundred.
- **d.** Two million, three hundred sixty-two thousand, four hundred seventy-five.

9. Write these numbers in words: 6010; 10,394.

USING ROUND NUMBERS



David went by plane from New York to Pittsburgh. He said the trip was "about three hundred miles." The exact distance is a little more than three hundred miles, but David rounded the number downward to the *nearest hundred*. A number which has been rounded is a little more or a little less than the exact number. Round numbers are easier to remember and use than exact numbers.

In 1926 the number of passengers carried by scheduled domestic airlines in this country was 5,782. Here we can round the number upward to the *nearest thousand* and say the number of passengers carried was about 6000.

In 1930 the number of airplane passengers was 384,506. This number rounded to the *nearest hundred-thousand* is 400,000.

In 1935 the number of airplane passengers was 678,549. What is this number, rounded to the *nearest hundred-thousand*?

The number of airplane passengers in four later years is shown below.

1940	2,802,781	1950	17,343,681
1945	6,576,252	1955	38,498,068

1. Round the number of passengers carried by airplane in 1940, 1945, and 1950 to the nearest thousand.

2. Round all four numbers to the nearest ten-thousand.

3. Round all four numbers to the nearest hundred-thousand.

4. Round the first number to the nearest million. Round the other three numbers to the nearest five hundred-thousand, or half-million.

FINDING THE TOTAL

Some children in Franklin School gave a play. Read each of the problems below carefully. Find the answers to the questions.

1. The children used 18 yards of cloth to make a curtain for the stage, and 15 yards to make costumes. How many yards of cloth did they use in all?

2. John made 3 large posters to announce the play, Ruth made 2, Fred made 4, James made 1, Alice 2, and Dan 3. How many posters were made?

3. The cloth cost $14.95 and the poster paper cost $1.75. How much was spent in all?

4. The boys sold 123 tickets, and the girls sold 118. How many tickets were sold in all?

5. Three groups of children sang in the chorus. There were 24 children in one group, 26 in another, and 28 in the third group. How many children were there in the chorus?

When you add numbers, the answer is the **sum.** The plus sign (+) tells you to add.

KNOWING THE ADDITION FACTS

If you know the addition facts perfectly, all work in addition should be easy for you. Write the sums on folded paper. Check your work.

If you make any mistakes, do the examples again. Practice them until you are sure that you know them.

	a	b	c	d	e	f	g	h
1.	8	7	6	9	7	6	8	4
	2	9	8	5	2	7	7	2
2.	3	9	2	7	4	3	5	6
	3	4	8	8	9	6	5	3
3.	3	2	8	5	3	9	5	7
	5	3	5	2	8	2	6	4
4.	6	2	4	2	7	9	3	4
	2	7	4	9	3	8	9	8
5.	3	5	9	4	7	5	8	9
	2	3	7	6	7	4	3	6
6.	3	2	9	6	3	6	8	2
	7	4	9	5	4	9	4	6
7.	7	2	6	7	8	4	8	9
	5	5	4	6	8	5	6	3
8.	2	5	4	6	8	4	5	5
	2	7	3	6	9	7	9	8

You can easily add 1 to any number, or add any number to 1.

$8 + 1 = 9$ $\quad 1 + 1 = ?$ $\quad 9 + 1 = ?$

$1 + 5 = 6$ $\quad 1 + 3 = ?$ $\quad 1 + 7 = ?$

EASY ADDITION EXAMPLES

Remember that a zero in a number means that there is nothing in that place to add.

Write the sums for these examples.

	a	b	c	d	e	f	g
1.	37	63	50	82	50	15	96
	82	45	74	86	50	90	53
2.	88	64	91	51	69	44	95
	20	75	80	98	50	84	73
3.	63	87	85	52	30	73	70
	91	40	62	84	98	93	36

ADDING A ONE-PLACE NUMBER TO A TWO-PLACE NUMBER

When you see 23 and 6, you know that the sum is similar to the sum of 3 and 6; 3 and 6 are 9, so 23 and 6 are 29.

The sum of 25 and 4 is similar to the sum of 5 and 4. What is the sum of 25 and 4?

Say the sums for these examples.

1.	24	22	16	21	22	24	12
	3	5	2	6	7	2	4
2.	36	24	17	23	31	42	35
	3	5	1	4	8	2	3
3.	53	65	37	43	58	23	41
	5	4	2	3	1	2	4

4. Study the examples below. Do you see how they are alike?

	a	b	c	d
5 7 12	15 7 22	25 7 32	35 7 42	45 7 52

All four of the examples above are similar to 5 and 7. You know that 5 and 7 are 12. In Example **a**, the sum of 15 and 7 is a number similar to 12. It is 22.

Look at Example **b**. You know that the sum of 25 and 7 is similar to the sum of 5 and 7. What is the sum of 25 and 7?

In Example **c**, you see 35 and 7. What is the sum?

Look at Example **d**. How can you tell that the sum of 45 and 7 is 52?

Cover the answers to the examples above. Now say them.

Each example below is similar to an addition fact you know. Use the fact you know to find the sum.

	a	b	c	d	e	f	g	h
5.	19 3	24 6	17 7	29 4	26 8	38 4	23 7	19 6
6.	49 9	35 8	37 3	56 4	27 9	59 2	36 6	28 8
7.	65 6	59 7	39 5	78 9	43 9	58 9	74 7	67 5
8.	85 9	33 8	64 9	49 1	16 9	82 8	48 5	88 3
9.	67 8	38 7	76 5	87 4	46 7	54 8	67 6	26 8

COLUMN ADDITION

When adding a column of numbers, begin at the top of the column and add down. In the example at the right think, 3 and 6 are 9, and 8 are 17, and 7 are 24, and 9 are 33.

To make sure that the sum is correct, check your work by adding again. This time start at the bottom of the column and add up. If you get the same sum by adding both ways, your work is probably correct.

Work	Check
3	3
6	6
8	8
7	7
9	9
33	33

Write the sums on folded paper.

	a	b	c	d	e	f	g	h
1.	5	9	4	7	6	3	7	8
	6	6	6	9	8	7	5	8
	6	4	7	4	7	8	9	9
	4	8	9	5	9	5	5	7
	6	7	6	8	8	2	9	8
2.	7	8	9	6	5	9	4	3
	3	4	9	4	8	4	3	8
	5	5	6	9	6	9	7	9
	6	6	7	7	2	7	5	7
	8	9	6	8	7	5	3	8
	7	9	8	8	3	3	6	9

Sometimes zero is a number, as in scores in a game.

3. In playing ring toss, Nancy's scores were 7, 8, 0, 9, 6, and 5. What was her total score?

4. Fred's scores were 8, 0, 5, 7, 8, and 9. What was his total score?

Copy,

	a
1.	17
	23
2.	68
	55
	70
3.	252
	585
4.	435
	727
	386

ADDITION WITH CARRYING

The state of Washington has a coastline of 157 miles. The coastline of Oregon is 296 miles long, and that of California is 840 miles long. What is the total length of the Pacific coastline?

Add the ones' column first. Think, 7 and 6 are 13, or 1 ten and 3 ones. Write the 3 in ones' column, and carry the 1 ten to tens' column.

```
 157
 296
 840
1,293
```

Add the tens. The sum, 19 tens, means 1 hundred and 9 tens. Write the 9 in tens' column and carry the 1 hundred to hundreds' column. Add the hundreds. What is the sum?

Copy, add, and check. Carry as needed.

	a	b	c	d	e	f	g
1.	17 23	25 49	66 15	44 26	39 47	57 78	45 46
2.	68 55 70	89 90 56	94 53 4	57 97 55	30 38 68	73 77 60	79 45 78
3.	252 585	495 532	364 965	545 873	723 486	697 482	162 644
4.	435 727 386	637 59 704	900 58 56	273 780 429	88 362 800	976 43 88	484 46 907

PRACTICING ADDITION

SET I

Copy, add, and check. Copy figures accurately in straight columns.

	a	b	c	d	e	f
1.	84	58	77	45	60	95
	76	33	87	54	27	55
	58	56	34	27	64	64
	10	24	77	78	38	38
	35	70	31	53	32	46
2.	82	54	36	25	40	18
	39	37	86	59	61	86
	54	61	48	56	37	77
	11	70	64	20	54	30
	67	76	80	46	90	65

SET II

Copy, add, and check. You may have to carry tens, or hundreds, or thousands, or even all three of these.

1.	2468	3575	5389	7647	6283	1544
	8543	2769	4858	5328	7754	8987
2.	4397	278	6000	714	6545	389
	4629	5650	307	679	6636	573
	430	6208	995	8403	25	4000
3.	923	619	474	3685	7626	8953
	23	736	593	4997	7250	939
	79	30	788	4085	5478	39

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SET I

	a
1.	$.08
	.05
	.06
	.04
2.	$6.28
	5.08
	.30
	5.50

SET II

1.	$12.48
	26.04
	42.50
2.	$80.00
	37.68
	4.69

3. Write the
$.05, $19.14,

ADDING DOLLARS AND CENTS

In adding money, keep dollars under dollars, and cents under cents. There are always two places at the right of the decimal point for cents. If the number of cents is less than ten cents, such as four cents or seven cents, a zero is written to the right of the decimal point: \$.04 or \$.07.

Copy, add and check. Place the decimal point and dollar sign in each answer to show that the sum means money.

SET I

	a	b	c	d	e	f
1.	\$.08	\$.44	\$3.65	\$3.00	\$5.96	\$4.75
	.05	.17	2.80	.78	2.09	4.95
	.06	.30	4.48	1.07	.78	.18
	.04	.28	5.25	1.20	.09	.37
2.	\$6.28	\$3.75	\$1.84	\$9.28	\$.03	\$4.05
	5.08	.29	7.40	.67	.01	4.57
	.30	2.50	.75	.43	.03	.08
	5.50	.05	.07	.04	.02	.37

SET II

1.	\$12.48	\$35.00	\$86.75	\$38.40	\$86.04	\$50.90
	26.04	37.95	17.33	9.89	6.09	30.75
	42.50	14.06	3.46	.86	3.03	9.00
2.	\$80.00	\$91.29	\$73.54	\$26.13	\$45.87	\$69.13
	37.68	67.85	.80	57.54	6.32	57.62
	4.69	8.00	6.08	.49	70.08	60.66

3. Write the following numbers in a column and add: \$2.80, \$.05, \$19.14, and \$36.

MAKING SURE OF ADDITION

EXTRA PRACTICE 335

Write the sums for these examples. If you make mistakes, study again the pages listed at the right of the rows.

	a	b	c	d	e	
1.	5	9	2	8	6	10
	4	2	3	6	9	
	8	7	8	5	8	
	6	8	4	3	7	
	8	3	9	7	5	
2.	37	59	65	46	70	11
	43	14	20	36	96	
			37	50	38	
3.	424	523	900	64	275	11
	617	59	84	373	732	
	265	568	98	908	85	
4.	69	50	46	6848	5476	11
	85	48	20	6792	3544	
	20	47	17	257	305	
	17	90	67			
5.	$6.47	$7.73	$15.60	$23.83	$94.08	13
	3.70	1.60	18.79	36.75	6.05	
	6.89	.98	60.07	4.09	.88	

YOUR TEACHER MAY LET YOU DO PAGES 359-360

Keeping on Your Toes

1. Write the number that means $1\frac{1}{2}$ million.

2. Write the number that means 1 less than 1,000,000.

3. Beginning at the right, what does the first 6 mean in the number 6,666? the second 6? the third 6? the fourth 6?

4. Add the following football scores made by one team in each quarter of a game: 7, 0, 14, and 6.

TWENTY-FOUR HOURS AT AIRPORTS

USING NUMBERS TO UNDERSTAND OUR WORLD

1. During a recent year, the magazine, *Life*, studied the amount of airline business in the United States in one 24-hour period. A total of 136,823 passengers were carried in airplanes during the period. How many passengers is this, rounded to the nearest thousand?

2. During the 24 hours, there were 1,095 planes with scheduled flights, 69 planes were ready as a reserve in case of emergency, and 123 planes were in shops for inspections and repairs. What was the total number of airplanes used, held in reserve, or worked on during the twenty-four hour period?

3. The planes used 2,901,909 gallons of aviation fuel. To the nearest million, how many gallons is this?

4. At Washington, D.C., there were 427 arrivals of planes and 408 departures. What was the total number of arrivals and departures from the airport?

5. Atlanta, Ga., took care of 9,958 passengers. Dallas, Texas, had 6,809 passengers. What was the total for these two airports on that day?

6. During this one day, the city whose airports handled the greatest weight of baggage was New York. The total was 456,118 pounds. What is this weight rounded to the nearest ten-thousand pounds?

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KNOWING WHEN TO SUBTRACT

1. Dick spends his winter vacations at a ski resort. This year he wanted to buy some new skis, with steel edges and safety binders attached. They cost $27.75. Dick had only $15.50. How much more money did he need?

2. Dick's older brother, Jim, paid $39.95 for a pair of skis. Dick's skis cost how much less than Jim's?

3. Dick had saved $25.25 to buy a new ski suit. The suit cost $23.00. How much money did he have left?

4. At the resort where the boys ski there is a 650-foot rope tow for the beginners' area. In another area there is a 1050-foot rope tow. What is the difference in the length of the tows?

You subtract to find the answers to the following questions:

1. How many more, or how much more, will be needed?
2. How many fewer, or how much less, will there be?
3. How many, or how much, will be left?
4. What is the difference?

We sometimes use the minus sign ($-$) to show that a smaller number is to be subtracted from a larger number. For example, $98 - 26$ means that 26 is to be subtracted from 98; $98 - 26 = 72$.

In subtraction, the answer is called the **difference,** or **remainder.**

KNOWING THE SUBTRACTION FACTS

In order to subtract accurately, it is necessary to know the subtraction facts perfectly. Write the remainders for the examples below on folded paper. Check your work. Keep practicing until you have a perfect score.

	a	b	c	d	e	f	g	h	i
1.	7 4	8 7	12 4	13 6	10 4	11 7	17 9	15 8	12 3
2.	9 5	5 4	14 6	12 7	18 9	8 6	11 5	6 4	16 7
3.	8 5	9 8	10 6	7 6	9 3	11 4	4 3	5 2	12 8
4.	6 3	11 9	8 3	13 4	16 8	7 5	8 4	5 3	13 5
5.	7 2	10 9	15 7	11 8	12 9	10 3	17 8	11 2	8 2
6.	11 6	9 7	12 5	14 7	9 4	11 3	3 2	15 6	10 7
7.	6 5	16 9	10 2	6 2	13 9	10 5	9 6	15 9	10 8
8.	14 9	12 6	7 3	13 8	4 2	13 7	9 2	14 5	14 8

It is easy to subtract 1 from any number.

$9 - 1 = 8$ $5 - 1 = ?$ $8 - 1 = ?$

EASY SUBTRACTION

When you subtract, begin at the right and subtract ones from ones, tens from tens, and so on.

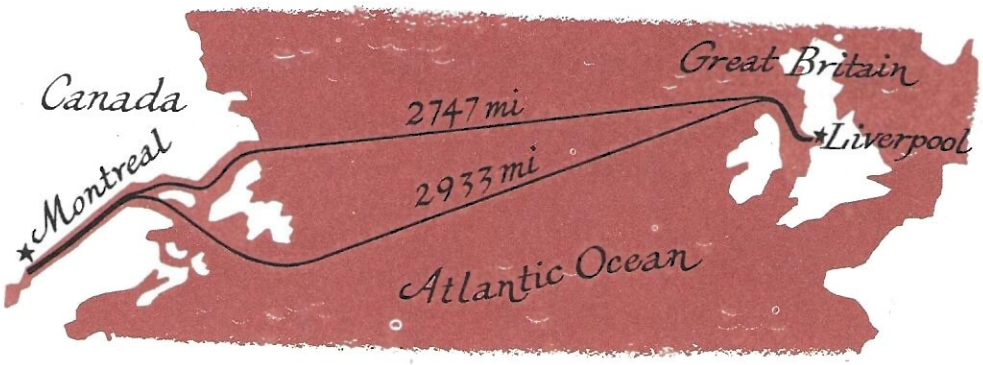
Copy and subtract.

	a	b	c	d	e	f
1.	138 45	147 73	119 82	158 86	129 64	105 53
2.	107 45	138 74	179 95	118 52	127 74	149 68
3.	157 91	105 72	139 83	187 96	149 57	166 72
4.	166 83	157 62	114 32	139 96	108 63	113 92

5. Lake Superior is 383 miles in length. Lake Michigan is 321 miles long. Lake Superior is how many miles longer than Lake Michigan?

6. Lake Michigan, at its widest point, is 118 miles wide. Lake Ontario is 53 miles wide. How much wider is Lake Michigan?

7. The greatest depth in Lake Ontario is 778 feet. The greatest depth in Lake Erie is 210 feet. What is the difference in depth?



USING TENS AND HUNDREDS SO YOU CAN SUBTRACT

By one route, the distance by ship from Montreal, Canada, to Liverpool, England, is 2933 miles. By another route, the distance is 2747 miles. One route is how much longer than the other?

To find the answer, subtract 2747 from 2933. You cannot subtract 7 ones from 3 ones so you use 1 of the 3 tens. Since 1 ten is the same as 10 ones, you now have 13 ones. You can subtract 7 from 13.

$$\begin{array}{r} 2933 \\ 2747 \\ \hline 186 \end{array}$$

You cannot subtract 4 tens from the 2 tens that are left, so you use one of the 9 hundreds. One hundred is the same as 10 tens, so you now have 12 tens. Subtract 4 from 12.

Now subtract 7 hundreds from 8 hundreds.

To check a subtraction example, add the remainder to the number you subtracted. If the sum of these two numbers is the same as the number from which you subtracted, your work is probably correct.

$$\begin{array}{r} 2933 \\ 2747 \\ \hline 186 \\ \hline 2933 \end{array}$$

Copy, subtract, and check.

	a	b	c	d	e	f
1.	685 359	993 837	877 248	636 257	974 687	859 365
2.	6938 5769	5872 1293	7555 6258	3624 2336	6992 2458	9853 7494

ZEROS IN SUBTRACTION

1. In the example at the right, you subtract 5 ones from 9 ones, and write 4 in the remainder. The zero in tens' place shows that there is nothing to subtract from the 5. Write 5 in the remainder. Subtract 2 hundreds from 4 hundreds.

```
459
205
254
```

2. In this example, you can subtract 4 ones from 6 ones, but you cannot subtract 4 tens from 0 tens. You use one of the hundreds. This is 10 tens. Then 4 tens from 10 tens is 6 tens. Write 6 in the remainder. Now subtract the hundreds: 3 from 7 is 4.

```
806
344
462
```

3. In the example at the right, you cannot subtract 8 ones from 6 ones. After you use 1 ten, there are no tens left in the top number. Then use one of the hundreds and subtract as in Example **2.**

```
816
628
188
```

4. In this example, you have to use 1 of the 7 hundreds and change it to 10 tens. Now use 1 ten, changing it to 10 ones. Think, 3 from 10 is 7. There are only 9 tens left; 7 from 9 is 2. Subtract the hundreds: 2 from 6 is 4.

```
700
273
427
```

Now, do this example again, this time subtracting rapidly. Think, 3 from 10 is 7, 7 from 9 is 2, and 2 from 6 is 4.

Copy, subtract, and check the examples below.

	a	b	c	d	e	f
5.	547 204	808 253	918 469	900 548	600 367	700 339
6.	715 448	507 125	969 208	800 373	429 305	514 216

SUBTRACTING LARGER NUMBERS

Mount Elbert, the highest peak in Colorado, has an altitude of 14,431 feet. Mount Mitchell, in North Carolina, has an altitude of 6,684 feet. What is the difference in the height of these two peaks?

Subtract 6,684 from 14,431. In this example you will use one of the tens, one of the hundreds, one of the thousands, and the 1 in ten-thousands' place.

$$\begin{array}{r} 14{,}431 \\ 6{,}684 \\ \hline 7{,}747 \end{array}$$

▶ We place a comma in a four-figure number when it is to be subtracted from a number of more than four figures.

Copy and subtract. Check your work by adding.

	a	b	c	d	e
1.	68,312	92,473	41,003	69,244	16,267
	2,533	3,875	5,907	9,949	9,688
2.	92,325	83,107	25,282	59,146	38,275
	77,456	46,623	6,498	43,899	15,287

SUBTRACTING MONEY

Copy the examples below and subtract. Keep dollars under dollars and cents under cents. Check by adding.

Remember that there are two places at the right of the point for cents. Place the dollar sign and decimal point in each answer to show that the remainder means money.

1.	$9.50	$6.00	$15.00	$16.08	$42.50
	3.87	2.75	6.48	9.09	8.04
2.	$98.70	$84.22	$50.45	$59.30	$90.00
	37.92	40.37	28.96	50.41	64.13
3.	$859.54	$500.50	$123.65	$802.27	$993.70
	802.57	326.96	89.75	755.29	954.09

PRACTICING SUBTRACTION

	a	b	c	d	e
1.	426 178	348 105	709 284	800 457	614 269
2.	4752 3523	7802 988	8720 6892	7000 2484	3581 2611
3.	61,935 2,579	93,196 72,508	40,200 5,198	60,000 52,750	67,059 41,388
4.	68,444 24,468	72,884 6,895	90,226 41,277	53,969 39,170	83,067 42,375

5. Find the difference between 268 and 500.

6. Subtract 648 from 802.

7. 60,400 − 23,850 = ?

8. $24.50 minus $9.75 = ?

9. Find the remainder: $75.15 − $7.98 = ?

10. How much less is 287 than 630?

Solve the following problems:

11. The average depth of the Pacific Ocean is 14,048 feet. The average depth of the Atlantic Ocean is 12,880 feet. The average depth of the Atlantic is how much less than that of the Pacific?

12. In 1934, an explorer reached a depth of 3,028 feet in the Atlantic Ocean. Twenty years later, an explorer reached a depth of 13,287 feet, also in the Atlantic Ocean. The 1954 record was how much greater than the 1934 record?

13. At one place near the Philippine Islands, the Pacific Ocean is 35,400 feet deep. At a place near Puerto Rico, the Atlantic Ocean is 30,246 feet deep. What is the difference in depth?

MAKING SURE OF SUBTRACTION

Write the remainders for these examples on folded paper. If you make mistakes, study again the pages given at the right of the rows.

EXTRA PRACTICE 336

	a	b	c	d	e	
1.	166 94	158 77	119 74	123 52	178 81	
2.	594 259	583 426	8762 6284	4937 3469	8546 2257	20
3.	749 503	908 756	717 568	800 167	500 354	21
4.	65,059 41,288	94,682 46,003	52,002 9,798	23,500 9,518	40,225 13,089	22
5.	$6.40 1.72	$7.22 3.75	$13.35 9.07	$200.70 58.99	$802.00 546.31	22

YOUR TEACHER MAY LET YOU DO PAGES 361-362

Keeping on Your Toes

1. From which number below can each of the other numbers be subtracted?

125 98 486 358 475

2. Does $1000 - 437 = 752 - 189$?

3. Does $348 - 189 = 352 - 192$?

4. What is the difference between 10 and 100? between 100 and 1000?

5. John subtracted 273 from 806. His remainder was 633. What did he forget?

KEEPING IN PRACTICE

SET I

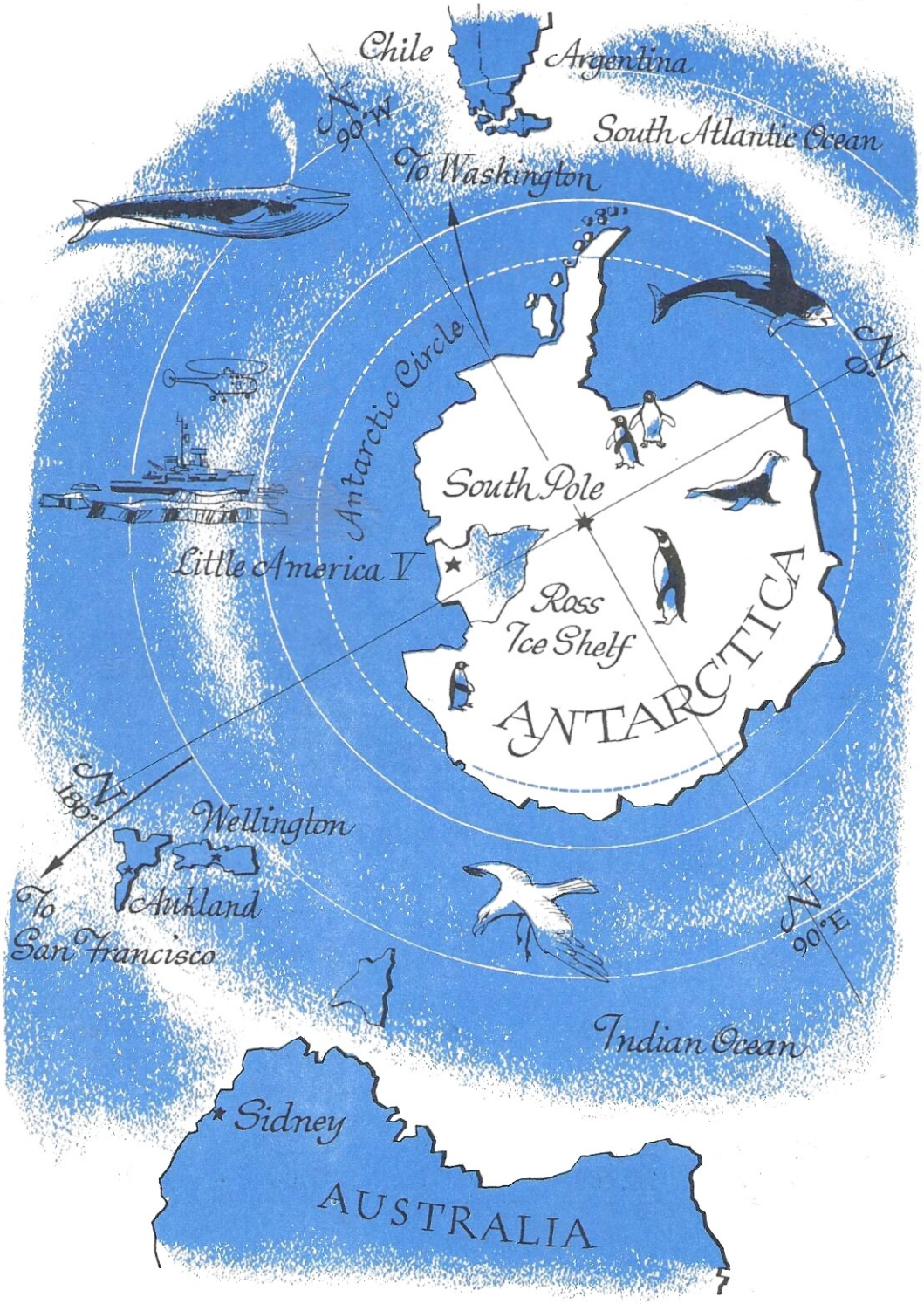
Copy the examples below and add. Check your work.

	a	b	c	d	e
1.	65 40 18 29 90	27 18 40 32 54	90 70 28 36 45	15 89 38 42 80	54 17 30 39 78
2.	309 76 220 547	300 682 80 239	$8.76 2.49 .98 .09	$4.26 1.97 3.65 .70	$6.00 .47 2.05 5.50
3.	3504 7876 653	1980 608 7090	$27.40 9.34 3.09	$54.08 8.07 2.03	$60.90 40.95 8.00

SET II

Copy, subtract, and check.

1.	523 198	607 329	800 268	715 457	925 536
2.	1562 985	2714 937	4000 2976	3126 1748	6300 2854
3.	83,472 19,576	55,325 28,769	14,230 9,870	80,500 32,009	68,478 48,509


Chile
Argentina
90°W
South Atlantic Ocean
To Washington
Antarctic Circle
0°
South Pole
Little America V
Ross
Ice Shelf
ANTARCTICA
180°
Wellington
Auckland
To
San Francisco
90°E
Indian Ocean
Sidney
AUSTRALIA

ANTARCTICA

Antarctica is one part of the world that is not completely known. During recent expeditions there by the United States and other nations, the United States expedition was commanded by the famous explorer, Admiral Byrd.

USING NUMBERS TO UNDERSTAND OUR WORLD

1. Admiral Byrd sailed on his first expedition to Antarctica in 1928. His flagship was the *City of New York*, which weighed 502 tons. In 1956, on his fifth trip, he sailed on the *Glacier*, which weighed 8,625 tons. How much heavier was the *Glacier*? How many years separated Admiral Byrd's first and fifth trips?

2. The distance from Washington, D.C., to the South Pole, by way of Little America V, is 9,573 miles. From Washington to Little America V is 8,761 miles. How far is Little America V from the South Pole?

3. "Operation Deep Freeze" carried 1,800 men from the United States to Antarctica to establish bases and construct camps. Later 1,632 returned to the United States. How many men were left in Antarctica to carry on construction and scientific work?

4. By way of Pago Pago, it is 5,715 miles from San Francisco to Auckland, New Zealand. After a ship reached Pago Pago, 4,150 miles from San Francisco, how many miles of its trip to Auckland remained?

5. In 1956 the *U.S.S. Glacier* sighted a gigantic iceberg near Scott Island. The surface of the iceberg covered about 12,480 sq. mi. The size of Connecticut is 5,009 sq. mi. About how much larger than Connecticut was the iceberg?

6. Airplanes for use in the Australian expedition were flown from Sydney, Australia, to Wellington, New Zealand. Then they were flown 2,800 miles to the Ross Ice Shelf, for a total of 4,034 miles. What was the air distance between Sydney and Wellington?

DECIDING WHAT PROCESS TO USE

First read each problem and think it through carefully. When you are sure you understand the problem and know what the question asks, decide whether to add or subtract—that is, what **process** to use. Check each answer.

1. Mr. Thomas, the Scoutmaster, decided he would be comfortable on this year's week-end camp-outs. He bought an air mattress for $4.95 and an air pump to inflate it for $3.49. How much did the two cost?

2. Kenny had a new camp kit that cost $2.19. Tom's had cost $2.88. Kenny's kit cost how much less than Tom's?

3. At the beginning of the year the balance in the treasury was $13.85 and dues amounting to $10.80 were collected. Then the Rotary Club donated $125 to the troop. What was the total amount in the treasury?

4. Mr. Thomas bought the food. The total cost of the food was $42.84. Each of the 23 boys in the troop paid one dollar toward expenses. How much money had to be taken from the treasury to pay the balance of the expense for food?

5. Mr. Thomas noted the mileage showing on his odometer at the beginning of the trip to the camp. It was 23,167. When he returned to town from camp, the mileage was 23,204. How many miles had he driven?

UNITS OF MEASURE

The unit of measure you use depends on what you want to measure. To measure some things you use small units. To measure other things you use large units.

1. Tell what units you would use to measure the following.

Meat	Length of a trip	Length of a class period
Eggs	Height of a mountain	Width of a book

2. Tell what things you could measure with the following units.

yard	pint	day	ounce
bushel	gallon	week	ton

3. Tell what each of the following abbreviations means. If you are not sure of all of them, turn to page 398.

oz.	hr.	qt.	doz.	pt.	mo.	yr.	in.	min.	pk.
gal.	mi.	ft.	wk.	T.	yd.	lb.	da.	bu.	sec.

Copy these statements and supply the missing numbers.

	a	b
4.	1 qt. = ? pt.	1 da. = ? hr.
5.	1 pt. = ? cups	1 bu. = ? pk.
6.	1 ft. = ? in.	1 min. = ? sec.
7.	1 T. = ? lb.	1 yr. = ? da.
8.	1 gal. = ? qt.	1 pk. = ? qt.
9.	1 wk. = ? da.	1 doz. = ? things
10.	1 lb. = ? oz.	1 hr. = ? min.

Tell which is less:

11.	3 gal. or 10 qt.	1 yr. or 14 mo.
12.	2 doz. or 20 things	1 min. or 40 sec.
13.	1 bu. or 5 pk.	2 qt. or 5 pt.
14.	1 lb. or 18 oz.	1 ft. or 10 in.

WHEN AND HOW TO MULTIPLY

1. A group of boys picked 4 boxes of fine apples. They wanted to sell the apples by the pound. Each box contained 32 pounds of apples. How many pounds of apples were there in the 4 boxes?

```
 32
 32
 32
 32
---
128
```

2. Another way to find the total weight of the 4 boxes is to multiply. Multiply the 2 in ones' place by 4. Where do you write the 8? Then multiply the 3 in tens' place by 4. Where do you write the 2? the 1?

```
 32
  4
---
128
```

▶ You save time by multiplying when you want to find the total of several numbers which are the same.

In multiplication, the number by which you multiply is called the **multiplier.** The answer is called the **product.**

This sign (×) tells you to multiply. You read $4 \times 3 = 12$, "four 3's are 12" or "4 times 3 equals 12."

KNOWING THE MULTIPLICATION FACTS

How well do you know the multiplication facts? Test yourself. Write the products on folded paper. Check your work. Learn any facts you do not know.

	a	b	c	d	e	f	g	h
1.	2	6	2	3	9	7	7	3
	2	3	9	2	3	5	7	4
2.	4	4	3	2	3	8	4	7
	9	4	6	7	9	9	5	6
3.	9	6	7	8	5	9	5	3
	8	6	4	2	7	6	8	7
4.	6	9	8	6	4	9	8	4
	8	7	5	9	7	2	3	3
5.	7	4	5	9	6	9	7	8
	8	2	4	9	2	4	3	6
6.	5	8	6	8	2	4	5	3
	2	4	5	7	3	6	5	3
7.	8	9	5	6	2	3	7	2
	8	5	3	4	6	5	9	8
8.	5	2	6	4	2	7	3	5
	9	4	7	8	5	2	8	6

When you multiply a number by 1, or 1 by a number, the product is the same as the number.

One 9 is 9

$$\begin{array}{r} 9 \\ \times\ 1 \\ \hline 9 \end{array}$$

Six 1's are 6

$$\begin{array}{r} 1 \\ \times\ 6 \\ \hline 6 \end{array}$$

PRACTICE IN MULTIPLICATION

Copy and multiply.

	a	b	c	d	e	f	g	h
1.	93	72	83	71	92	84	81	91
	2	4	3	7	3	2	9	6
2.	41	52	31	62	53	64	91	73
	5	2	8	4	3	2	4	2

MULTIPLICATION WITH CARRYING

In multiplying, you may have to carry, as shown in the example at the right. First think, five 5's are 25, or 2 tens and 5 ones. Write the 5 in ones' place. Then multiply the 3 tens by 5 and add the 2 tens that you carried. Where do you write the 7? What do you carry?

$$\begin{array}{r} 435 \\ \times\ 5 \\ \hline 2175 \end{array}$$

Now multiply the 4 hundreds by 5. Five 4's are 20; 20 and the 1 you carried make 21 hundreds. In what place do you write the 1 of the 21? the 2?

Copy and multiply. Check by multiplying again.

	a	b	c	d	e	f
1.	348	256	579	748	468	694
	5	6	8	3	7	9
2.	759	357	269	386	937	847
	4	9	5	8	7	6

Write the answers to the following examples.

	a	b	c
3.	Six 8's and 4 are ?	$9 \times 6 + 5 = ?$	$8 \times 4 + 3 = ?$
4.	Nine 4's and 2 are ?	$2 \times 9 + 1 = ?$	$5 \times 7 + 4 = ?$
5.	Three 6's and 1 are ?	$6 \times 4 + 3 = ?$	$4 \times 9 + 3 = ?$
6.	Nine 9's and 7 are ?	$7 \times 5 + 4 = ?$	$9 \times 7 + 6 = ?$

MULTIPLYING ZEROS BY A NUMBER

Remember that a zero in a number means that there is nothing in that place to be multiplied.

1. In the example at the right, the first two figures are zeros. Write 0 in ones' place and 0 in tens' place in the product. Then think, four 6's are 24. Write the 4 in hundreds' place and the 2 in thousands' place.

$$\begin{array}{r} 600 \\ \times\ 4 \\ \hline 2400 \end{array}$$

2. Here, there are no tens in tens' place. Since there are no tens in tens' place and no tens to be carried, write zero in tens' place in the product.

$$\begin{array}{r} 503 \\ \times\ 3 \\ \hline 1509 \end{array}$$

3. In this example there are no tens in tens' place, but there are 2 tens carried from ones' place. Write the 2 in tens' place in the product. Six 8's are 48. Write the 8 in hundreds' place and carry the 4 thousands. Six 2's are 12, and the 4 thousands you carried make 16 thousands. Write the 6 in thousands' place and the 1 to the left in ten-thousands' place.

$$\begin{array}{r} 2804 \\ \times\ 6 \\ \hline 16{,}824 \end{array}$$

Copy and multiply. Check your work.

	a	b	c	d	e	f
4.	800×7	400×9	900×8	802×4	305×7	703×3
5.	809×5	208×3	700×9	906×7	300×4	908×9
6.	5467×5	2356×6	7240×7	8500×8	9405×3	6509×4
7.	$14{,}700 \times 4$	$74{,}809 \times 6$	$63{,}500 \times 9$	$59{,}806 \times 2$	$47{,}263 \times 8$	$31{,}200 \times 5$

MULTIPLYING DOLLARS AND CENTS

Copy, multiply, and check. Remember to place a dollar sign and a decimal point in each product.

	a	b	c	d	e
1.	\$5.38 × 7	\$8.36 × 4	\$2.87 × 9	\$3.86 × 5	\$6.08 × 3
2.	\$7.35 × 6	\$4.78 × 8	\$6.57 × 2	\$2.69 × 6	\$9.25 × 3
3.	\$64.19 × 7	\$41.90 × 9	\$90.24 × 5	\$15.97 × 4	\$63.91 × 8
4.	\$50.63 × 9	\$20.70 × 7	\$14.80 × 6	\$31.74 × 3	\$50.20 × 8

5. A harness maker sold 5 bridles at \$13.50 each. How much did he receive for the five bridles?

6. He also sold 4 saddles at \$59.95 each. How much did he receive for the four saddles?

Keeping on Your Toes

1. Remember that 3×6 means three 6's, or 6 multiplied by 3; 6×3 means six 3's, or 3 multiplied by 6. Tell what each of the following examples means.

4×8 $\quad$ 8×4 $\quad$ 9×2 $\quad$ 2×9

2. Does $6 \times 4 = 4 \times 6$? Does $9 \times 5 = 5 \times 9$?

3. What is the product when a number is multiplied by 1? when 1 is multiplied by another number?

4. In which of the following examples could you find the answer by multiplying as well as by adding?

a. $7 + 7 + 7 + 7 = ?$ $\quad$ **b.** $9 + 6 + 3 + 5 = ?$

c. $19 + 26 + 100 + 34 = ?$ $\quad$ **d.** $35 + 35 + 35 + 35 = ?$

MULTIPLYING BY A TWO-PLACE NUMBER

Mr. Lantz is spraying his apple trees. In his orchard, there are 35 trees in each row, and there are 42 rows. How many trees does he have to spray?

Here the multiplier, 42, is a two-place number. First multiply 35 by 2 and write the 70.

Then multiply 35 by 4. Think, four 5's are 20. Notice that the first figure, 0, is in tens' place under the 4, because you are multiplying by 4 tens. Now think, four 3's are 12 and 2 carried makes 14. Write 4 to the left of the 0, in hundreds' place, and 1 in thousands' place. Do you see that the 140 really means 1400?

```
  35
  42   multiplier
 ---
  70   partial product
 140   partial product
---
1470   product
```

The 70 and the 140 are called **partial products.** Add the partial products to get the final product. The final product is 1470.

Copy and multiply. Check by multiplying again.

	a	b	c	d	e
1.	57 82	39 94	96 57	49 26	28 59
2.	69 38	58 74	75 59	86 62	46 94
3.	73 67	47 74	25 68	43 95	68 46
4.	48 38	37 83	79 96	69 37	24 53

ZEROS IN MULTIPLICATION

If a bus travels at an average speed of 48 miles per hour, how far can it travel in 30 hours?

To find the answer, multiply 48 by 30. The zero shows that there is nothing in ones' place to multiply by, but you must write zero in ones' place in the product before you multiply by the 3 tens.

$$\begin{array}{r} 48 \\ \times\ 30 \\ \hline 1440 \end{array}$$

When you multiply 48 by the 3, write 144 to the left of the zero. How far can the bus travel in 30 hours?

Copy and multiply.

	a	b	c	d	e	f
1.	63 × 40	79 × 50	86 × 20	53 × 90	94 × 60	48 × 30
2.	96 × 10	48 × 70	58 × 60	39 × 80	89 × 40	75 × 80
3.	48 × 90	57 × 70	36 × 50	75 × 30	68 × 80	79 × 20
4.	70 × 60	90 × 30	80 × 50	50 × 40	60 × 90	40 × 80

In the next two rows of examples, remember to place the decimal point and dollar sign in each product.

5.	\$.36 × 60	\$.69 × 70	\$.47 × 40	\$.35 × 20	\$.52 × 50	\$.83 × 10
6.	\$.97 × 90	\$.27 × 80	\$.32 × 70	\$.49 × 50	\$.63 × 30	\$.82 × 60

HOW TO CHECK IN MULTIPLICATION

If a field produces about 18 bushels of wheat per acre, about how many bushels are produced by 24 acres?

In the examples at the right, this problem has been worked and checked. To check the work you multiply again, this time using 18 as the multiplier. The two products are the same, showing that the work is correct.

About 432 bushels are produced by 24 acres.

Work	Check
18	24
24	18
72	192
36	24
432	432

Copy and multiply. Then check your work by multiplying again, using the top number as the multiplier.

	a	b	c	d	e	f
1.	34 68	79 35	84 47	58 29	62 76	69 49
2.	95 86	46 53	37 79	76 82	85 35	73 14

When there are more figures in the top number than in the multiplier, it is easier to check by multiplying again, using the same number as multiplier.

3.	624 37	149 29	307 15	700 94	539 63	809 47
4.	580 59	370 87	807 62	623 49	485 18	906 58
5.	1246 46	4078 53	5069 87	2356 92	7500 46	7090 32

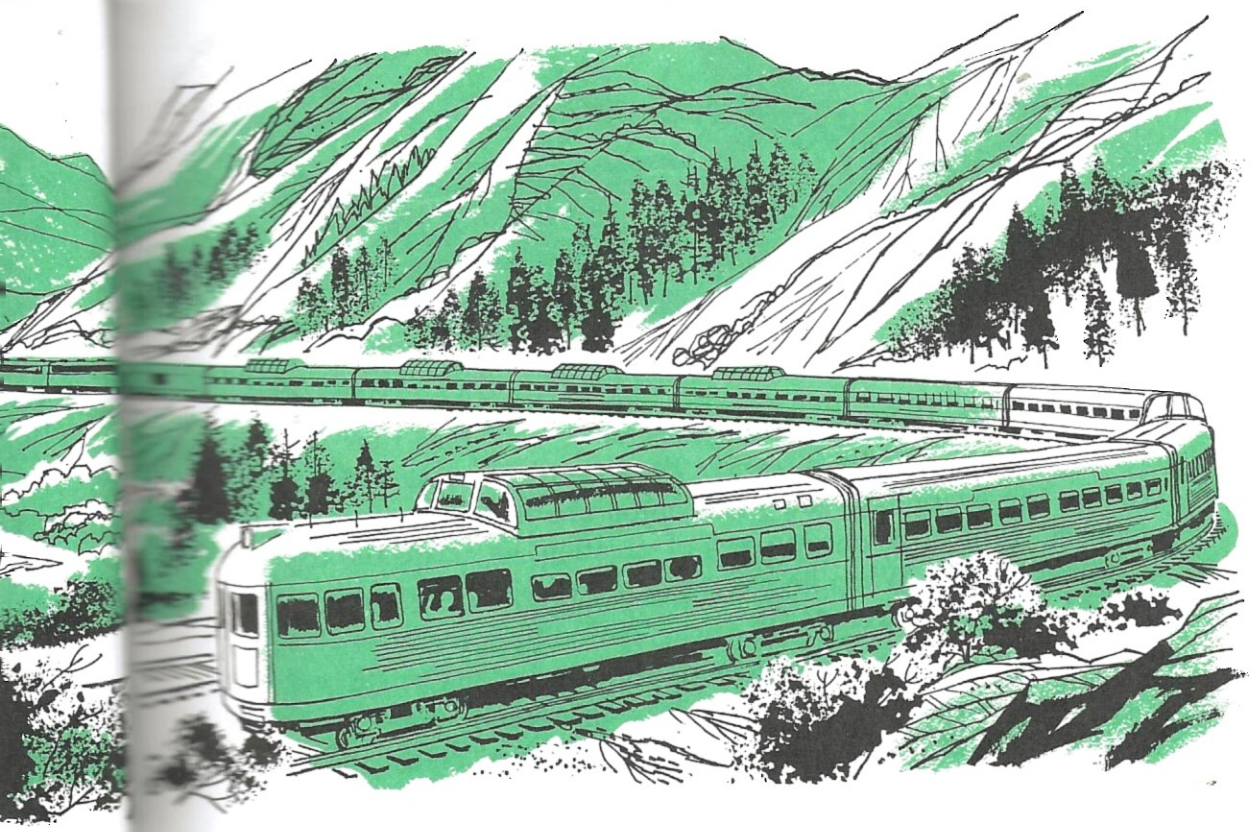
WHAT DOES THE QUESTION ASK?

Be sure that you know what the question asks before you attempt to solve the problem. Read each problem carefully before you begin figuring.

1. A train like the one pictured above travels between Chicago and San Francisco. It has 5 cars with glass domes. There are 24 seats in each dome. What is the total number of passengers who can enjoy the view from these seats at one time?

2. The train travels 1039 miles from Chicago to Denver and 1498 miles from Denver to San Francisco. How many miles is the total trip?

3. The distance by air between Chicago and San Francisco is 1856 miles. What is the difference between the air and railroad mileage?



4. A round-trip coach ticket between Chicago and San Francisco costs $99.45. The tax is $9.95. What is the total cost of the ticket?

5. A one-way coach ticket from Chicago to San Francisco costs $61.12. The tax is $6.11. What is the total cost of the ticket? How much would you save by buying a round-trip ticket instead of two one-way tickets?

6. A train similar to the one in the picture leaves Chicago each morning at 8:15 and arrives in Minneapolis at 3 P.M. How long does it take to make the trip?

7. The distance between Chicago and Minneapolis is 437 miles. When an engineer has made the trip 23 times, how many miles has he traveled?

8. If a train travels at an average rate of 64 miles an hour, how far can it travel in 16 hours?

MULTIPLYING BY THREE-PLACE NUMBERS

Donald's father is an engineer on a train that runs between Chicago and Clinton, Iowa, a distance of 138 miles. He makes the trip every day, going to Clinton one day, and returning the next. If he takes only 1 week of vacation, he makes the trip 358 times a year. When he has made the trip 358 times, how many miles has he traveled?

To find the answer you multiply 138 by 358.

First multiply by the 8 in ones' place and write the first figure of the partial product in ones' place.

Next multiply by the 5 in tens' place. Write the first figure of the partial product in tens' place.

Then multiply by the 3 in hundreds' place. Write the first figure of this partial product in hundreds' place. Add the three partial products.

```
  138
  358
-----
1 104
 6 90
 41 4
-----
49,404
```

When Donald's father has made 358 trips, he has traveled 49,404 miles.

Copy and multiply. Check your work.

	a	b	c	d	e	f
1.	325	579	648	312	869	468
	248	356	725	379	498	316
2.	372	974	748	586	629	865
	165	789	234	957	342	618

ZEROS IN THE MULTIPLIER

1. Three hundred persons bought tickets on a sight-seeing boat at $1.25 each. How much was received for all the tickets?

To find the answer, multiply $1.25 by 300. First, write two zeros in the product, since the zeros in 300 mean that there is nothing in ones' place or tens' place by which to multiply. Then, multiply by the 3 in hundreds' place.

$$\begin{array}{r} \$1.25 \\ 300 \\ \hline \$375.00 \end{array}$$

2. In this example, first multiply by the 7 in ones' place.

The 0 in tens' place means there is nothing in that place by which to multiply. Simply skip the 0 and multiply by the 6 in hundreds' place. This time, 4, the first figure of the partial product, is written in hundreds' place because you are multiplying by 6 hundreds.

$$\begin{array}{r} 324 \\ 607 \\ \hline 2\,268 \\ 194\,4 \\ \hline 196{,}668 \end{array}$$

Copy and multiply. Check your work.

	a	b	c	d	e	f
3.	$6.34 306	$5.27 504	$3.89 702	$8.46 805	$4.57 209	$9.57 608
4.	963 900	764 700	257 300	139 400	391 500	819 300

In the examples below there may be zeros in the multiplier, in the top number, or in both.

5.	403 572	460 693	600 725	200 896	937 480	280 370
6.	579 570	800 860	937 306	624 400	798 200	600 800

MAKING SURE OF MULTIPLICATION

Copy the examples below and multiply.

If you make mistakes, study again the pages listed at the right of the rows.

EXTRA PRACTICE 337

	a	b	c	d	e	
1.	426 × 4	943 × 6	267 × 8	639 × 5	246 × 7	32
2.	700 × 7	800 × 9	904 × 2	407 × 9	809 × 8	33
3.	9700 × 4	65087 × 6	48200 × 5	15430 × 8	36905 × 3	33
4.	$3.09 × 7	$9.62 × 8	$50.86 × 4	$26.90 × 9	$78.34 × 3	33
5.	92 × 57	46 × 65	61 × 79	47 × 28	59 × 14	35
6.	87 × 60	83 × 40	$.48 × 70	$.85 × 80	$.27 × 90	36
7.	627 × 34	152 × 26	5073 × 75	3900 × 68	9435 × 93	35
8.	357 × 428	729 × 357	684 × 692	418 × 358	572 × 169	40
9.	358 × 905	586 × 703	629 × 800	139 × 900	824 × 400	41

YOUR TEACHER MAY LET YOU DO PAGES 363-364

SUMMER COTTAGES

Many people make a living by renting summer cottages.

1. Mr. Taylor built 18 summer cottages at a cost of $5800 each. How much did it cost to build all the cottages?

2. He bought a refrigerator for each of the 18 cottages. Each refrigerator cost $169.75. What was the total cost?

3. Mr. Taylor paid $187.50 each for gas stoves for his cottages. How much did he pay in all?

4. Thirty-six porch chairs were bought at $5.98 each. How much did he pay for all the chairs?

5. One hundred sixty-two pairs of curtains were needed for all the cottages. They were bought at $3.69 a pair. What was the total cost of the curtains?

6. Mr. Taylor rented the 18 cottages for $125 a week each. How much rent did he receive in two weeks?

7. He sold 12 of the cottages at $6900 each. What was the total amount received?

8. Mr. Foster had 10 cottages for rent at $150 a week. If they were all rented, how much rent did he receive in three weeks?

9. He sold eight of these cottages at $7500 each. How much did he receive in all?

KEEPING IN PRACTICE

SET I

Copy these examples. Add and check.

	a	b	c	d	e
1.	79 62 45 90 54	65 29 7 3 40	205 490 576 607	530 88 76 409	89 447 50 852
2.	$34.66 37.70 5.09	$50.70 8.73 6.57	$ .68 9.85 80.92	$ 3.49 55.59 48.00	$26.04 7.08 79.08

SET II

Copy, subtract, and check.

1.	1525 976	4500 720	7305 2548	8000 3579	6356 1787
2.	$470.08 296.75	$124.40 66.08	$240.80 83.45	$700.00 328.36	$642.37 245.98

SET III

Copy, multiply, and check.

1.	79 39	69 80	308 25	480 78	500 39
2.	236 347	427 506	578 405	759 720	468 900

WHAT INFORMATION IS GIVEN?

The information given in each problem will help you decide whether to add, subtract, or multiply. Be sure to check each answer.

1. For use on the playground, the school bought five volleyballs at $3.31 each. How much did the school spend?
   Is it better to add or multiply to find the answer?

2. At the same time the school bought a football for $4.98 and a soccer ball for $5.59. What did the school spend for these two items?

3. Table tennis balls come six in a box and cost 39¢ a box. The school bought 24 boxes of balls for a year's supply. What was the total cost of a year's supply of balls?

4. Before Jack's birthday his uncle said he would buy either a football helmet or shoulder pads for him. The price of a helmet was $2.75; the shoulder pads were priced at $3.49. How much more did the shoulder pads cost than the helmet?

5. Jeff likes basketball. His father paid $1.69 for a goal and net to put up over the garage door. Then he bought a basketball for $3.79 and a pump to inflate the ball for 89¢. How much did he spend in all?

6. Jeff's father gave the clerk in the sporting goods store a ten-dollar bill. How much change did he receive?

7. Mr. White wanted to buy a dartboard for the recreation room at home. One was priced at $3.24, another at $1.98. What was the difference in the prices of the two boards?

8. At the same time Mr. White bought 9 extra darts so that four boys could play at the same time. Each dart cost 13¢. What did he pay for 9?

KNOWING WHEN TO DIVIDE

1. Edward has 35 specimens of rocks and minerals in his collection. Some of them he found himself. He has put them in a box, with 5 specimens in each row. How many rows are there in the box? How many 5's in 35?

You know that 35 divided by 5 is 7. There are 7 rows of specimens in the box. There are seven 5's in 35.

2. David has 100 specimens of rocks and minerals in his collection. He has them in a large box, with 10 in each row. How many rows are there in the box? How many 10's in 100?

▶ We divide to find how many smaller groups of equal size can be made from a larger group.

3. Kenneth has 25 samples of rocks and minerals. He arranged them in 5 equal groups. How many were there in each group? What is $\frac{1}{5}$ of 25?

To find $\frac{1}{5}$ of 25, divide 25 by 5.

4. Ruth has 18 pieces of quartz. She wants to give her sister half of them. How many should she give her sister?

▶ When we know the total number, and how many equal groups there are to be, we divide to find how many there will be in each group.

In division, the number by which you divide is called the **divisor.** The number which is divided is called the **dividend.** The answer is called the **quotient.**

$$\begin{array}{r} 4 \quad \text{quotient} \\ \text{divisor}\ 6\overline{)24}\ \text{dividend} \end{array}$$

The division sign ($\div$) tells you to divide. The example, $24 \div 6 = 4$, is read, "24 divided by 6 equals 4."

KNOWING THE DIVISION FACTS

Before beginning work in division, make sure that you know all of the division facts. Write the quotients on folded paper. Check your work. If you make any mistakes, do the examples again. Practice until you can make a perfect score.

	a	b	c	d	e	f	g	h
1.	$5\overline{)10}$	$9\overline{)36}$	$4\overline{)20}$	$6\overline{)12}$	$7\overline{)35}$	$7\overline{)14}$	$2\overline{)10}$	$7\overline{)56}$
2.	$8\overline{)72}$	$6\overline{)36}$	$8\overline{)16}$	$5\overline{)40}$	$4\overline{)16}$	$7\overline{)21}$	$2\overline{)6}$	$4\overline{)24}$
3.	$9\overline{)18}$	$8\overline{)48}$	$6\overline{)54}$	$3\overline{)6}$	$6\overline{)42}$	$6\overline{)18}$	$3\overline{)12}$	$5\overline{)35}$
4.	$3\overline{)27}$	$8\overline{)32}$	$4\overline{)8}$	$8\overline{)56}$	$4\overline{)32}$	$3\overline{)24}$	$5\overline{)20}$	$4\overline{)28}$
5.	$7\overline{)49}$	$5\overline{)30}$	$8\overline{)40}$	$4\overline{)36}$	$9\overline{)63}$	$5\overline{)15}$	$8\overline{)24}$	$2\overline{)14}$
6.	$5\overline{)45}$	$2\overline{)16}$	$6\overline{)30}$	$3\overline{)15}$	$2\overline{)18}$	$3\overline{)21}$	$9\overline{)54}$	$7\overline{)63}$
7.	$9\overline{)72}$	$3\overline{)18}$	$9\overline{)27}$	$3\overline{)9}$	$2\overline{)12}$	$5\overline{)25}$	$4\overline{)12}$	$6\overline{)48}$
8.	$7\overline{)28}$	$9\overline{)81}$	$6\overline{)24}$	$7\overline{)42}$	$2\overline{)4}$	$9\overline{)45}$	$2\overline{)8}$	$8\overline{)64}$

When a number is divided by 1, the quotient is the same as the number.

$$1\overline{)5}\quad 5 \qquad 1\overline{)9}\quad 9 \qquad 1\overline{)6}\quad ? \qquad 1\overline{)8}\quad ?$$

When the divisor is the same as the dividend, the quotient is 1.

$$4\overline{)4}\quad 1 \qquad 7\overline{)7}\quad 1 \qquad 9\overline{)9}\quad ? \qquad 3\overline{)3}\quad ?$$

1. If a truck travels 3 miles on a gallon of gasoline, how many gallons of gasoline will it use on a trip of 186 miles? How many 3's in 186?

You must first divide 18 by 3. You are really dividing 18 tens by 3. Write 6 in the quotient above the 8 in the dividend. Then, how many 3's in 6? Write 2 above the 6 in the dividend.

$$3\overline{)186}\quad 62$$

2. If a steamship travels 160 miles in 8 hours, what is the average number of miles traveled per hour?

How many 8's are there in 16? Write 2 above the 6 in the dividend. There is no remainder.

The zero in the dividend shows that there are no ones to divide. Write 0 in the quotient.

$$8\overline{)160}\quad 20$$

3. In 6 days, Mr. Carter sold 2400 gallons of gasoline at his gasoline station. On the average, how many gallons did he sell in a day? What is $\frac{1}{6}$ of 2400 gallons?

Divide 2400 by 6. How many 6's in 24? Where do you write the 4?

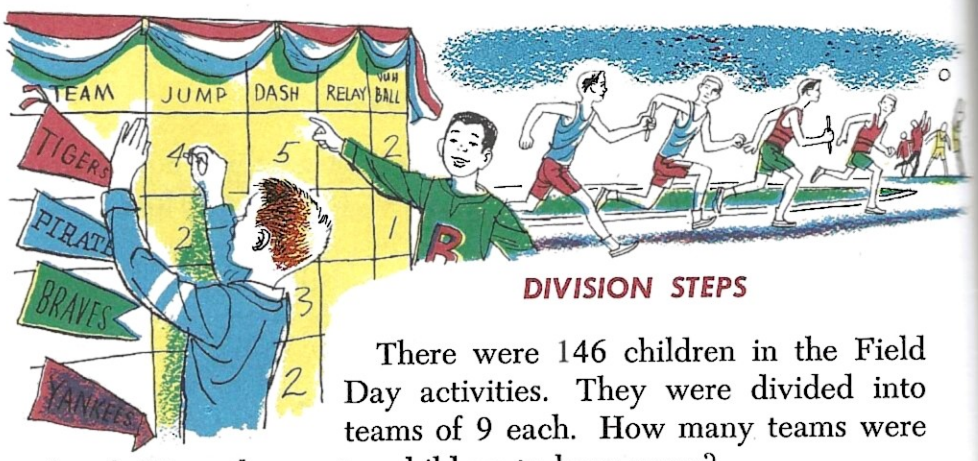
Every figure in the dividend must be used, so you must write 0 in both tens' place and ones' place in the quotient. The quotient is 400, not 4.

$$6\overline{)2400}\quad 400$$

▶ Always write each quotient figure above the last figure you are using in the dividend.

Copy and divide.

	a	b	c	d	e	f
4.	$3\overline{)123}$	$2\overline{)86}$	$4\overline{)164}$	$3\overline{)159}$	$7\overline{)420}$	$8\overline{)640}$
5.	$4\overline{)480}$	$9\overline{)630}$	$8\overline{)7200}$	$9\overline{)8100}$	$7\overline{)4900}$	$6\overline{)4800}$



DIVISION STEPS

There were 146 children in the Field Day activities. They were divided into teams of 9 each. How many teams were there? Were there extra children to keep score?

1. **Divide:** How many 9's in 14? Write 1 in the quotient above the 4 in the dividend.
2. **Multiply** 9 by 1. Write 9 under the 14.
3. **Compare** 9 with 14 to see that it is not larger than 14.
4. **Subtract** 9 from 14. The remainder is 5.
5. **Compare:** Is 5 less than the divisor, 9?
6. **Bring down** the 6 from the dividend and write it to the right of the 5.

$$\begin{array}{r} 1 \\ 9\overline{)146} \\ 9 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ 9\overline{)146} \\ 9 \\ \hline 56 \end{array}$$

To find the second quotient figure, divide 56 by 9. How many 9's in 56? Write 6 in the quotient. Multiply, compare, and subtract.

There is a remainder of 2. Compare: 2 is less than the divisor. Write 2 after the quotient this way: R2.

$$\begin{array}{r} 16\ R2 \\ 9\overline{)146} \\ 9 \\ \hline 56 \\ 54 \\ \hline 2 \end{array}$$

There were 16 teams for the games and 2 children to keep score.

Copy and divide.

	a	b	c	d	e
1.	$9\overline{)388}$	$7\overline{)261}$	$8\overline{)395}$	$6\overline{)584}$	$5\overline{)228}$
2.	$4\overline{)275}$	$6\overline{)328}$	$9\overline{)789}$	$3\overline{)227}$	$8\overline{)309}$

LEARNING TO CHECK DIVISION

The example at the right shows how to check a division example. You find the product of the quotient and the divisor. If there is a remainder, add it to this product. If the answer is the same as the dividend, the work is probably correct.

Work	Check
216 R1	216
6)1297	× 6
12	1296
9	+ 1
6	1297
37	
36	
1	

Copy the examples below. Divide and check.

	a	b	c	d	e
1.	4)2299	7)1986	5)2862	9)5787	3)2384
2.	5)1974	8)2156	6)2740	4)1588	7)6545

ZEROS IN THE QUOTIENT

Divide 56 by 8 and write 7 in the quotient. Is there a remainder? Bring down the 3. How many 8's in 3? Write 0 above the 3 and bring down the 7. How many 8's in 37? Where do you write the 4? Is there a remainder?

704 R5
8)5637
56
37
32
5

▶ Always write a figure in the quotient each time you use another figure in the dividend. If you cannot divide, write 0 in the quotient.

Divide and check.

1.	7)3546	5)1036	9)1856	8)3217	6)1206
2.	4)2720	6)5883	3)2255	7)5250	8)6406

FINDING AVERAGES

Nancy kept a record of the number of words she spelled correctly on each of five weekly tests. Then she found her average spelling score for the five weeks.

To find the average of several numbers you must first add them. Nancy added to find the total number of words spelled correctly in 5 weeks. Then she divided the total number, 90, by 5, the number of weeks. Nancy found that her weekly average was 18 correct words.

$$\begin{array}{r} 16 \\ 17 \\ 18 \\ 20 \\ 19 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 18 \\ 5\overline{)90} \\ 5 \\ \hline 40 \\ 40 \\ \hline \end{array}$$

This does not mean that her score each week was exactly 18 correct words. You can see that some weeks she spelled more than 18 words correctly, and other weeks fewer than 18. It means that if Nancy had spelled the same number of words correctly each week, the number would have been 18.

1. On a camping trip Frank spent \$2.37 one day, \$2.50 the next day, \$2.18 the third day, \$2.40 the fourth day, and \$2.25 the last day. What was the average amount Frank spent in a day?

2. For the paper drive, the sixth-grade pupils collected 98 pounds of paper one week, 110 pounds the next, 125 pounds the next, and 95 pounds the fourth week. What was the average number of pounds collected per week?

3. John saved \$12.00 in 8 weeks. What was the average amount John saved in a week?

4. What is the average speed of a train that travels 354 miles in 6 hours?

DIVISORS ENDING IN ZERO

1. The boys set up 180 chairs in the gymnasium. If they put 20 chairs in each row, how many rows were there?

Divide to find how many 20's there are in 180.

There are as many 20's in 180 as there are 2's in 18. Why is the 9 placed above the last figure of the 180?

$$20\overline{)180}\quad 9$$

Find the quotients.

	a	b	c	d	e
2.	$30\overline{)240}$	$50\overline{)250}$	$40\overline{)160}$	$70\overline{)420}$	$80\overline{)480}$
3.	$60\overline{)420}$	$20\overline{)180}$	$90\overline{)540}$	$50\overline{)350}$	$30\overline{)270}$

4. Another time 225 chairs were set up in the gymnasium. There were 30 chairs in each row. How many full rows were there? How many chairs were there to put in an extra row?

Divide 225 by 30.

There are as many 30's in 225 as there are 3's in 22. Write 7 above the 5 in ones' place.

Multiply 30 by 7.

Compare: Is 210 larger than 225?

Subtract: $225 - 210 = 15$.

Compare: Is 15 less than 30?

Now answer the questions asked in the problem.

$$\begin{array}{r} 7\ \text{R}15 \\ 30\overline{)225} \\ 210 \\ \hline 15 \end{array}$$

Copy and divide.

	a	b	c	d	e
5.	$30\overline{)246}$	$50\overline{)254}$	$60\overline{)487}$	$40\overline{)369}$	$20\overline{)165}$
6.	$70\overline{)498}$	$90\overline{)828}$	$80\overline{)342}$	$50\overline{)465}$	$30\overline{)184}$

DIVIDING BY TWO-PLACE NUMBERS

The swimming director said that 882 persons had used the pool in 21 days. What was the average number of persons using the pool per day?

Study the example as you read these steps.

1. **Divide:** There are about as many 21's in 88 as there are 20's in 88 or 2's in 8. Write 4 in the quotient above the 8 in tens' place.

$$\begin{array}{r} 4 \\ 21\overline{)882} \\ 84 \\ \hline \end{array}$$

2. **Multiply** 21 by 4. Write 84 under 88.

3. **Compare** 84 with 88 to see that the lower number is not larger than the number above it.

4. **Subtract** 84 from 88. The remainder is 4.

$$\begin{array}{r} 4 \\ 21\overline{)882} \\ 84 \\ \hline 42 \end{array}$$

5. **Compare** 4 with 21 to see that the remainder is less than the divisor.

6. **Bring down** 2 from 882. Place it to the right of the remainder, 4, and directly below the 2 in the dividend.

$$\begin{array}{r} 42 \\ 21\overline{)882} \\ 84 \\ \hline 42 \\ 42 \\ \hline \end{array}$$

To find the second figure in the quotient, divide 42 by 21. Where do you write the 2 in the quotient? Then multiply, compare, subtract, and compare, as before.

Copy and divide.

	a	b	c	d	e
1.	$12\overline{)144}$	$31\overline{)992}$	$11\overline{)154}$	$22\overline{)682}$	$12\overline{)288}$
2.	$42\overline{)924}$	$21\overline{)882}$	$32\overline{)384}$	$41\overline{)861}$	$11\overline{)165}$
3.	$22\overline{)268}$	$31\overline{)651}$	$21\overline{)672}$	$11\overline{)781}$	$12\overline{)492}$

John and Kenneth wanted to divide 298 safety posters into 14 equal groups for the 14 schools in the city. How many posters will there be for each school?

Divide 298 by 14. There are about as many 14's in 29 as there are 10's in 29 or 1's in 2. The 1 is the **trial divisor.** What do you write in the quotient? Where do you write it?

Multiply 14 by 2. Where is the 28 written? How do you get the number 18? Now you are ready to divide again.

How many posters were there for each school? How many extra posters were there?

$$\begin{array}{r} 21\ \text{R}4 \\ 14\overline{)298} \\ 28 \\ \hline 18 \\ 14 \\ \hline 4 \end{array}$$

▶ If the second figure of the divisor is 1, 2, 3, or 4, round the divisor downward in estimating the quotient figure.

Divide and check. To check a division example, multiply the divisor by the quotient and, if there is a remainder, add it to the product.

	a	b	c	d	e
4.	$21\overline{)260}$	$32\overline{)998}$	$12\overline{)498}$	$22\overline{)516}$	$24\overline{)318}$
5.	$42\overline{)892}$	$11\overline{)698}$	$22\overline{)959}$	$33\overline{)795}$	$14\overline{)169}$
6.	$44\overline{)586}$	$34\overline{)859}$	$23\overline{)325}$	$31\overline{)395}$	$34\overline{)720}$

DIVIDING LARGER NUMBERS

Mr. Webster has a date grove of 1890 trees. Each of the 42 rows in his grove has the same number of trees. How many trees are in each row?

Divide 1890 by 42. You see at once that you cannot divide 18 by 42, so divide 189 by 42, to find the first quotient figure.

There are about as many 42's in 189 as there are 4's in 18. Write 4 above the third figure in the dividend.

Multiply 42 by 4. Write 168 under the 189. Subtract 168 from 189. Bring down the 0. Divide 210 by 42.

$$\begin{array}{r} 45 \\ 42\overline{)1890} \\ 168 \\ \hline 210 \\ 210 \\ \hline \end{array}$$

▶ Remember to place the figure in the quotient above the last figure which you are using in the dividend.

Copy the following examples. Divide and check.

	a	b	c	d	e
1.	$22\overline{)1386}$	$41\overline{)2386}$	$33\overline{)1188}$	$52\overline{)3213}$	$74\overline{)5495}$
2.	$81\overline{)3858}$	$92\overline{)9192}$	$84\overline{)3581}$	$71\overline{)3376}$	$62\overline{)5359}$
3.	$53\overline{)3792}$	$42\overline{)3167}$	$31\overline{)2586}$	$21\overline{)1547}$	$34\overline{)3111}$

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74)5495

62)5359

34)3111

TRYING QUOTIENT FIGURES

Dick tied 300 old magazines into bundles of 12 each, for the paper collection. How many bundles did he have?

First Part		Second Part	
3	2	26	25
12)300	12)300	12)300	12)300
36	24	24	24
	60	60	60
		72	60

The green trial quotient figures are too large

The example above shows that sometimes you must try more than once before you get the correct quotient figure.

First Part. In the first part you try 3 as the quotient figure. You can see that 3 is too large, since 3 times 12 is more than 30. Next you try 2. Is 2 times 12 less than 30? Is 2 the correct quotient figure?

Second Part. First try 6 as the second quotient figure. Can you see why 6 is too large? What figure should you try next? Is 5 the correct quotient figure?

Sometimes you do not get the correct quotient figure the first time you try. After you multiply, compare the product with the part of the dividend you are using. If the first quotient figure you try is too large, try the next smaller figure.

Copy, divide, and check.

	a	b	c	d	e
1.	12)432	23)624	24)840	12)696	34)612
2.	24)408	33)1815	34)1632	24)600	14)476
3.	34)952	23)851	13)312	24)1392	13)598

4. The 24 children in Miss Day's class collected 1988 pounds of old newspapers. What was the average number of pounds collected by a child?

Study the work below, and think through each step.

The examples are like those on page 57 except that in this case there is a remainder.

First Part		Second Part	
9	8	83	82
24)1988	24)1988	24)1988	24)1988
216	192	192	192
	6	68	68
		72	48
			20

The red trial quotient figures are too large

▶ The average collected by a child was more than 82. We say "more than 82 pounds" because there is a remainder.

In some of the examples below you may have to try two or more times before you get the correct quotient figure. Good judgment in estimating quotient figures will come with practice.

Copy, divide, and check.

	a	b	c	d	e
5.	23)1524	34)1250	54)3549	64)2404	84)5699
6.	53)3050	84)4920	43)2432	42)1624	33)2403
7.	13)376	31)2325	23)1982	32)1839	41)1218
8.	30)2759	42)1888	52)3886	81)6561	93)6666
9.	24)1742	40)2485	33)2400	62)1810	22)1906

USING DIVISORS ENDING IN 8 OR 9

First Part

$$38\overline{)2439}\quad 6,\ 228,\ 159$$

Second Part

The green trial quotient figure is too small.

$$38\overline{)2439}\quad 63,\ 228,\ 159,\ 114,\ 45$$

$$38\overline{)2439}\quad 64\ \text{R}7,\ 228,\ 159,\ 152,\ 7$$

In the example above you see that the divisor, 38, is almost 40. You think, there are as many 40's in 243 as there are 4's in 24. The quotient figure, 6, is correct.

In the second part you are dividing 159 by 38. You think, there are as many 40's in 159 as there are 4's in 15. Try 3 as the quotient figure. When you multiply 38 by 3 you get 114. When you subtract you see at once that the remainder, 45, is larger than the divisor. Then you try 4, as shown at the right; 4 is correct.

If the divisor ends in 8 or 9, round the divisor to the next higher ten to get the trial divisor. This will make it easier for you to find the correct quotient figure, although you will not always find it the first time.

Copy, divide, and check.

	a	b	c	d	e
1.	$48\overline{)1313}$	$59\overline{)2617}$	$38\overline{)2750}$	$49\overline{)3212}$	$79\overline{)4228}$
2.	$78\overline{)4569}$	$79\overline{)6366}$	$89\overline{)4220}$	$48\overline{)2490}$	$38\overline{)1696}$
3.	$49\overline{)1840}$	$39\overline{)1999}$	$88\overline{)5684}$	$58\overline{)4160}$	$29\overline{)1587}$
4.	$39\overline{)3171}$	$38\overline{)1806}$	$69\overline{)2562}$	$28\overline{)2566}$	$78\overline{)7345}$

USING DIVISORS ENDING IN 5, 6, OR 7

When the divisor ends in 5, 6, or 7, you can often find the correct quotient figure more quickly if you round the divisor to the next higher ten to get the trial divisor.

Copy, divide, and check.

	a	b	c	d	e
1.	$27\overline{)1257}$	$56\overline{)1656}$	$87\overline{)6927}$	$36\overline{)2562}$	$75\overline{)2818}$
2.	$56\overline{)1058}$	$77\overline{)4519}$	$85\overline{)7209}$	$46\overline{)4301}$	$27\overline{)1015}$
3.	$77\overline{)3696}$	$86\overline{)2431}$	$57\overline{)2755}$	$87\overline{)4722}$	$35\overline{)1605}$
4.	$55\overline{)3014}$	$76\overline{)2842}$	$67\overline{)2495}$	$86\overline{)3225}$	$45\overline{)2050}$
5.	$65\overline{)3020}$	$85\overline{)2420}$	$46\overline{)2142}$	$37\overline{)2845}$	$75\overline{)5600}$

Keeping on Your Toes

1. What would the trial divisors be in estimating the quotients, when the divisors are as follows:

68 59 43 36 89 52 77 85

2. Is 57 nearer 50 or 60?

3. Is 34 nearer 40 or 30?

4. How many 20's in 75? How many 19's in 75?

5. How many 40's in 93? How many 39's in 93?

6. 32 ounces = ? pounds.

7. 300 minutes = ? hours.

8. 768 hours = ? days.

9. 86 oranges = ? dozen and ? oranges.

10. 250 seconds = ? minutes and ? seconds.

ESTIMATING THE QUOTIENT FIGURE

You have learned to round two-place divisors ending in 1, 2, 3, or 4 downward and two-place divisors ending in 5, 6, 7, 8, or 9 upward. When you do this you do not always get the correct quotient figure the first time.

If the divisor ends in 4, 5, or 6, it is helpful to round both ways. In the example at the right, the divisor, 25, is halfway between 20 and 30. You must use either 2 or 3 as the trial divisor. If you think, how many 2's in 18, the quotient figure is 9. If you think, how many 3's in 18, the quotient figure is 6.

```
  74
25)1862
 175
 ---
 112
 100
 ---
  12
```

The correct quotient figure is probably between 6 and 9, either 7 or 8. Try 7; $7 \times 25 = 175$. Is 7 the correct figure?

When you divide 112 by 25, think, how many 3's in 11, 3; how many 2's in 11, 5. Then try 4. Is 4 the correct figure?

Use this method to estimate the quotient figures in the following examples. Divide, and check your work.

	a	b	c	d	e
1.	$15\overline{)963}$	$25\overline{)1583}$	$25\overline{)1970}$	$15\overline{)784}$	$34\overline{)2845}$
2.	$25\overline{)1293}$	$35\overline{)2490}$	$15\overline{)690}$	$24\overline{)1789}$	$14\overline{)922}$
3.	$25\overline{)1895}$	$15\overline{)405}$	$24\overline{)1272}$	$35\overline{)2875}$	$34\overline{)1156}$
4.	$16\overline{)864}$	$36\overline{)2026}$	$45\overline{)2925}$	$16\overline{)529}$	$35\overline{)2676}$
5.	$24\overline{)1990}$	$36\overline{)1269}$	$44\overline{)2000}$	$34\overline{)1855}$	$35\overline{)1585}$

PRACTICE IN ESTIMATING QUOTIENT FIGURES

1. Study the example shown at the right. To get the trial divisor, round the 27 to 30. Think, how many 3's in 17? The answer is 5, but almost 6. Since the divisor, 27, is less than 30, it is sensible to try 6 as the quotient figure. Is it correct?

```
  65 R9
27)1764
  162
  144
  135
    9
```

When you divide 144 by 27, think, how many 3's in 14? The answer is 4, but almost 5. Try 5. Is it the correct quotient figure? How do you know?

Even when you think through examples in this way, you cannot always be sure of getting the correct quotient figure the first time. But you will succeed much more often.

2. Study the examples at the right. Think, how many 3's in 8? The answer is 2, but almost 3. Try 3; $3 \times 28 = 84$. The quotient figure, 3, is too large. How do you know? Then try 2. Is 2 the correct figure?

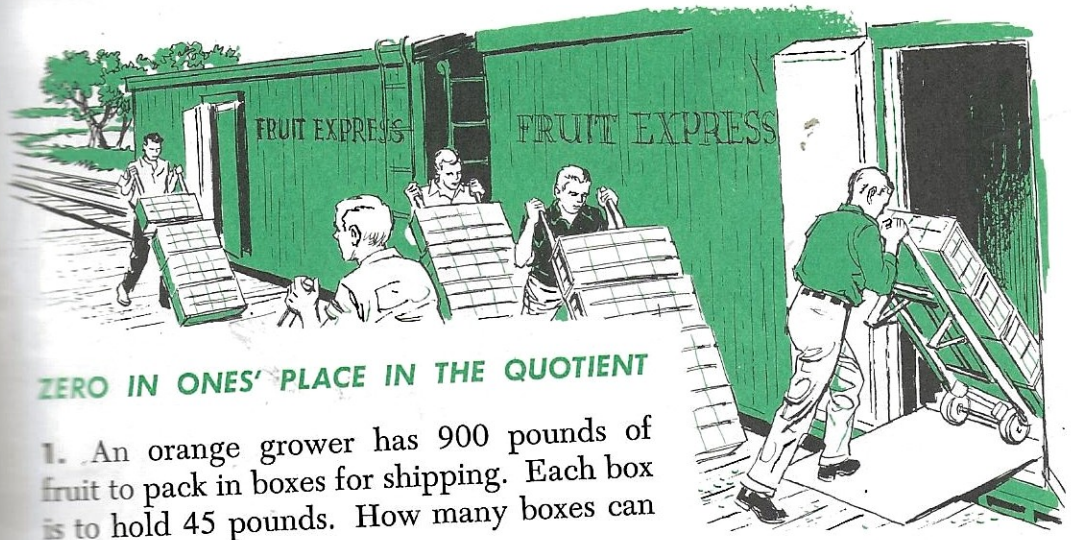
```
  3          2
28)83      28)83
 84         56
            27
```

3. Study the example at the right. Think, how many 2's in 21? The answer is 10, but you know that a quotient figure can never be more than 9. Is 9 the correct figure?

```
  94
23)2162
  207
   92
   92
```

Copy, divide, and check.

	a	b	c	d	e
4.	$26\overline{)844}$	$49\overline{)2499}$	$36\overline{)2424}$	$27\overline{)1493}$	$56\overline{)2880}$
5.	$47\overline{)2460}$	$37\overline{)2345}$	$48\overline{)1499}$	$17\overline{)548}$	$66\overline{)4095}$
6.	$44\overline{)4268}$	$53\overline{)5198}$	$64\overline{)6028}$	$82\overline{)7614}$	$72\overline{)7066}$



ZERO IN ONES' PLACE IN THE QUOTIENT

1. An orange grower has 900 pounds of fruit to pack in boxes for shipping. Each box is to hold 45 pounds. How many boxes can be filled?

When dividing, you often have a zero at the end of the quotient. Since you cannot divide 0 by 45, you must write 0 in ones' place in the quotient. The quotient must be 20. It cannot be 2.

$$45\overline{)900}\quad 20,\ 90$$

2. A fruit grower has 255 selected apples to pack in gift boxes. Twenty-four apples are to be packed in each box. How many boxes can be filled?

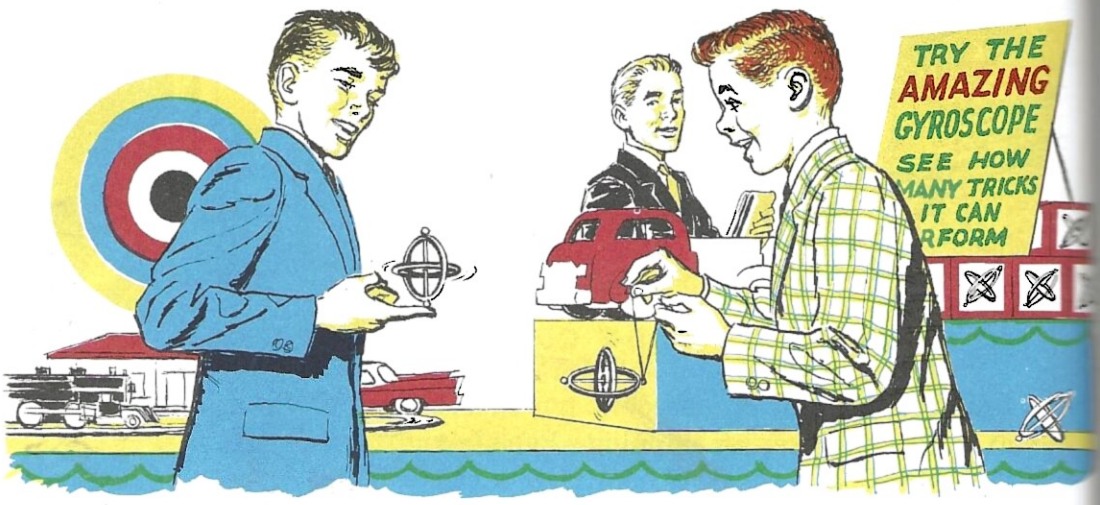
Subtract and bring down the 5; 15 is smaller than 24; so write 0 in the quotient.

Ten boxes can be filled and there will be 15 extra apples.

$$24\overline{)255}\quad 10\text{ R}15,\ 24,\ 15$$

Copy these examples. Divide and check. Write zero in the quotient when it is needed.

	a	b	c	d	e
3.	$12\overline{)480}$	$15\overline{)750}$	$24\overline{)960}$	$35\overline{)2100}$	$43\overline{)3440}$
4.	$14\overline{)842}$	$12\overline{)251}$	$18\overline{)551}$	$22\overline{)1560}$	$24\overline{)736}$
5.	$32\overline{)1284}$	$26\overline{)1567}$	$43\overline{)3455}$	$36\overline{)2897}$	$63\overline{)5684}$
6.	$65\overline{)5878}$	$67\overline{)5379}$	$84\overline{)6801}$	$89\overline{)4497}$	$93\overline{)1900}$



DIVIDING MONEY NUMBERS

At an auction sale, Mr. Carlson bought 35 gyroscopes for $24.15 for his toy shop. What was the cost of one gyroscope?

Divide here just as you divide in other examples. You know that the quotient is money and that there must be a decimal point and a dollar sign in the quotient. What is the answer to the question?

$$\begin{array}{r} \$.69 \\ 35\overline{)\$24.15} \\ 210 \\ \hline 315 \\ 315 \\ \hline \end{array}$$

Copy the following examples. Divide and check. Some of the examples will have remainders, just as other division examples do.

	a	b	c	d	e
1.	$27\overline{)\$9.45}$	$45\overline{)\$7.45}$	$54\overline{)\$6.93}$	$61\overline{)\$9.15}$	$29\overline{)\$4.93}$
2.	$64\overline{)\$45.64}$	$68\overline{)\$11.67}$	$71\overline{)\$55.38}$	$83\overline{)\$38.18}$	$91\overline{)\$55.33}$
3.	$85\overline{)\$29.75}$	$76\overline{)\$39.40}$	$72\overline{)\$22.50}$	$54\overline{)\$20.19}$	$46\overline{)\$43.24}$
4.	$23\overline{)\$11.67}$	$37\overline{)\$27.11}$	$47\overline{)\$27.26}$	$56\overline{)\$40.32}$	$77\overline{)\$26.95}$
5.	$34\overline{)\$25.90}$	$36\overline{)\$16.92}$	$93\overline{)\$26.04}$	$87\overline{)\$46.56}$	$96\overline{)\$18.24}$

QUOTIENTS WITH THREE FIGURES

1. Mr. Scott bought 14 Colorado blue spruce trees to plant along his fence. The trees cost $97.30. What was the cost of one tree?

Divide $97.30 by 14. In this example, you must divide three times and there will be three figures in the quotient. The example is not finished until you have used every figure in the dividend.

$$\begin{array}{r} \$6.95 \\ 14\overline{)\$97.30} \\ 84 \\ \hline 133 \\ 126 \\ \hline 70 \\ 70 \\ \hline \end{array}$$

How can you prove that $6.95 is correct?

2. Mr. Scott also bought 12 shrubs to plant in his garden. He paid $23.40 for them. What was the average cost of the shrubs?

Copy, divide, and check.

	a	b	c	d	e
3.	$23\overline{)\$42.55}$	$36\overline{)\$85.68}$	$53\overline{)\$85.90}$	$16\overline{)\$38.95}$	$26\overline{)\$57.68}$
4.	$66\overline{)25256}$	$40\overline{)37040}$	$57\overline{)47264}$	$64\overline{)55907}$	$73\overline{)11648}$
5.	$75\overline{)53807}$	$82\overline{)10337}$	$94\overline{)33088}$	$86\overline{)46978}$	$98\overline{)14014}$

ZEROS IN THE QUOTIENT

1. If a plane flew from New York to Paris, a distance of 3646 miles, in 12 hours, what was its average speed in miles per hour?

In the example at the right, when you subtract the first time there is no remainder. Bring down the 4. There are no 12's in 4 so write 0 in the quotient. Bring down the 6. Now divide 46 by 12.

Since the remainder, 10, is about as large as the divisor, we say the plane's average speed was "almost 304 miles per hour."

```
      303
12)3646
   36
   ---
    46
    36
    --
    10
```

2. In this example, when you subtract the first time there is no remainder. Since neither 0 nor 5 can be divided by 48, write two 0's in the quotient. The quotient is 200 with a remainder of 5.

```
      200 R5
48)9605
   96
   --
    5
```

Copy, divide, and check.

	a	b	c	d	e
3.	24)2544	33)3580	38)7866	21)14763	23)11569
4.	35)7006	15)7512	46)18418	77)69333	83)58124
5.	71)8570	49)10245	62)58290	31)17670	98)68600

THE "SOO" CANALS

1. The Sault Sainte Marie Canals are so far north that they are closed by ice much of the year. During a recent year the canals were open to traffic only 29 weeks, but 465 thousand tons of pulpwood were carried through them in that time. About how many thousand tons of pulpwood passed through the canal per week, on the average?

USING NUMBERS TO UNDERSTAND OUR WORLD

2. One year 6,275 thousand tons of wheat passed through the canals from west to east. If the canals were open that year for 31 weeks, about what was the average number of thousand tons per week?

3. Iron ore is carried from mines in Minnesota to the steel mills in the East. One year 62,245 thousand tons passed through the canal. Write the complete number in figures. Read the number.

In August of that year 7,781 thousand tons of iron ore were carried through the canals. On the average, how many thousand tons of ore was this per day?

4. Before the canals are closed by ice in winter, as much iron ore as possible is shipped to the steel mills. In one 24-hour period, 315 thousand tons of ore passed through the canals. About how many thousand tons of ore passed through the canal per hour, on the average?

MAKING SURE OF DIVISION

EXTRA PRACTICE 338

Copy these examples and divide. Check your work. If you make mistakes, study again the pages given at the right.

	a	b	c	d	e	
1.	$5\overline{)4784}$	$9\overline{)2763}$	$6\overline{)5419}$	$8\overline{)3600}$	$7\overline{)5600}$	50
2.	$22\overline{)528}$	$11\overline{)792}$	$33\overline{)398}$	$43\overline{)913}$	$23\overline{)745}$	54 55
3.	$23\overline{)598}$	$32\overline{)2058}$	$53\overline{)2886}$	$43\overline{)565}$	$61\overline{)3941}$	56
4.	$12\overline{)912}$	$24\overline{)600}$	$44\overline{)3736}$	$51\overline{)3002}$	$14\overline{)1256}$	57 58
5.	$28\overline{)1528}$	$79\overline{)2815}$	$48\overline{)2245}$	$59\overline{)4032}$	$89\overline{)6555}$	59
6.	$57\overline{)4358}$	$85\overline{)4126}$	$36\overline{)3405}$	$56\overline{)2048}$	$37\overline{)2100}$	60

	a	b	c	d	
7.	$45\overline{)2884}$	$35\overline{)1893}$	$44\overline{)2896}$	$16\overline{)522}$	61
8.	$35\overline{)700}$	$94\overline{)6580}$	$28\overline{)562}$	$34\overline{)1720}$	63
9.	$35\overline{)\$9.10}$	$63\overline{)\$35.51}$	$54\overline{)\$23.95}$	$87\overline{)\$61.94}$	64
10.	$23\overline{)\$98.44}$	$43\overline{)16133}$	$76\overline{)53802}$	$35\overline{)22820}$	65
11.	$64\overline{)6978}$	$72\overline{)43493}$	$59\overline{)11903}$	$53\overline{)15927}$	66

YOUR TEACHER MAY LET YOU DO PAGES 365-367

Keeping on Your Toes

1. In a division example, the divisor is 24, the quotient is 48, and the remainder is 6. What is the dividend?

2. Ralph divided 14,640 by 48 and had a quotient of 35. What was wrong with his work?

3. Nancy divided 1188 by 28. Her answer was "42 R12." When she checked her work she got 1176 for the dividend. What did she forget to do?

A FALL VACATION

1. The Clarks took a fall trip to their cottage on the lake. The distance from their home to the lake was 276 miles. Mr. Clark was able to average 46 miles per hour because most of the trip was on the turnpike. How long did the drive take?

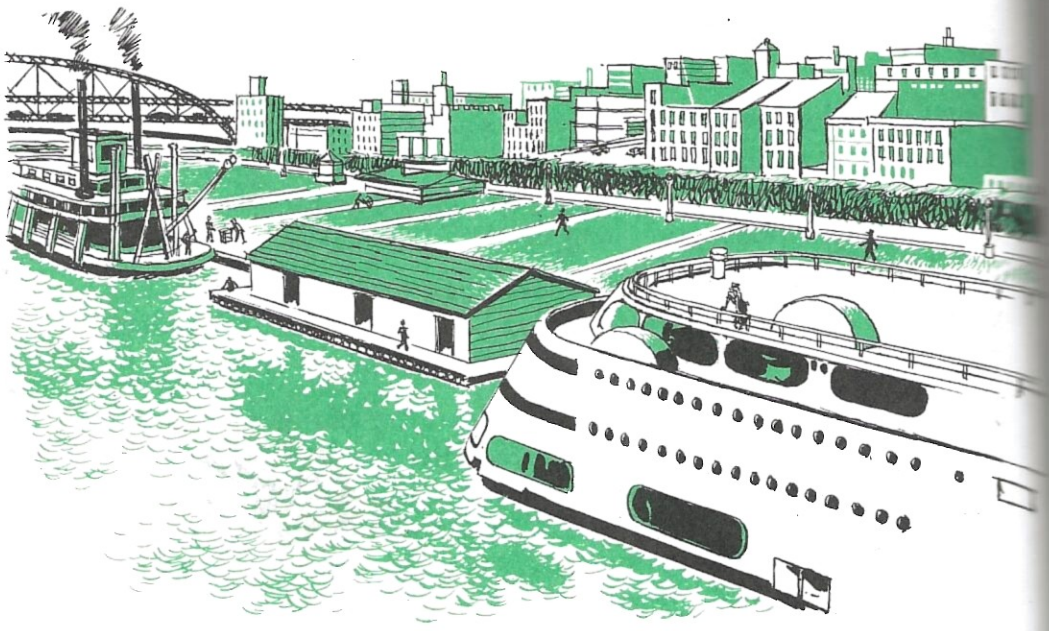
2. When the family stopped for lunch at a turnpike restaurant, Mr. Clark spent $1.25, Mrs. Clark $1.35, Jack 85¢, and Helen 75¢. What was the average cost of the luncheons?

3. Before the Clarks left, Mr. Clark filled the gasoline tank at a nearby filling station and made a note of the mileage. Just before they arrived at the lake, he stopped and had the tank filled again. Sixteen gallons were put in. Mr. Clark saw, from the odometer, that they had traveled 275 miles. About how many miles did they travel per gallon of gasoline?

4. On the way home Mr. Clark bought 14 gallons of gasoline for $4.62. How much did it cost per gallon?

5. Out of curiosity Helen counted the exits in a 254-mile stretch of turnpike they traveled. There were 32. About how many miles is the average distance between exits?

6. When the Clarks returned home, Mr. Clark said the 5-day vacation had cost $118.80 and was worth every penny. What was the average cost per day? What was the average daily cost per person?



WHAT PROCESS SHOULD YOU USE?

To solve a problem you must use two or more numbers. Think *about the numbers you must use* in solving these problems and decide how to use them.

1. St. Louis was founded in 1764 by the French as a fur-trading center. How old is the city?

2. The city occupies only 61 of the 2,520 square miles in the metropolitan area. How many square miles of the metropolitan area lie outside the city?

3. In 1956 the St. Louis metropolitan area had a population of 1,852,000. The city of St. Louis had almost one-half of this number. About how many people lived in the city?

4. The city was putting up a low-cost housing project that would contain 9,200 apartments. At a certain date, 4,887 had been built and rented; 1,320 were under construction. How many apartments had been finished or were under way? How many were still in the planning stage?

5. In addition, 5 fifteen-story apartment houses were proposed on Memorial Plaza. They were to contain 1,087 apartments. On the average about how many apartments were proposed for each building? Round your answer to the nearest whole number. About how many apartments were there to be per story?

6. The average rental per month of the apartments mentioned in Problem **5** was to be \$89. About what would the total income be from rental of the apartments?

KEEPING IN PRACTICE

1. Copy, add, and check.

a	b	c	d	e
809	426	2564	1395	7476
358	75	3967	8632	873
482	50	807	645	945
507	728			

2. Copy, subtract, and check.

5000	3200	63,245	55,487	84,004
2867	954	9,486	19,498	28,759

Copy, multiply, and check.

3.	48	39	406	580	600
	67	54	38	29	46
4.	327	587	875	649	579
	126	408	350	900	700

Copy, divide, and check.

5.	$25\overline{)1542}$	$33\overline{)1992}$	$44\overline{)1305}$	$53\overline{)5079}$	$62\overline{)4940}$
6.	$67\overline{)38322}$	$91\overline{)11778}$	$77\overline{)24493}$	$86\overline{)78308}$	$82\overline{)34025}$
7.	$92\overline{)73627}$	$84\overline{)59064}$	$80\overline{)16012}$	$62\overline{)12947}$	$59\overline{)35950}$

MAKING SURE OF Arithmetic

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